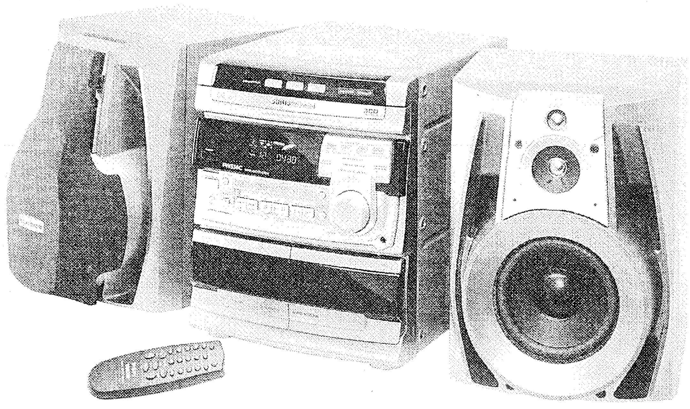
Mini System **FW530C/21/21M/22/37**

Service Service Service



Service Manual

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COMPACT disc DIGITAL AUDIO

CLASS 1 LASER PRODUCT

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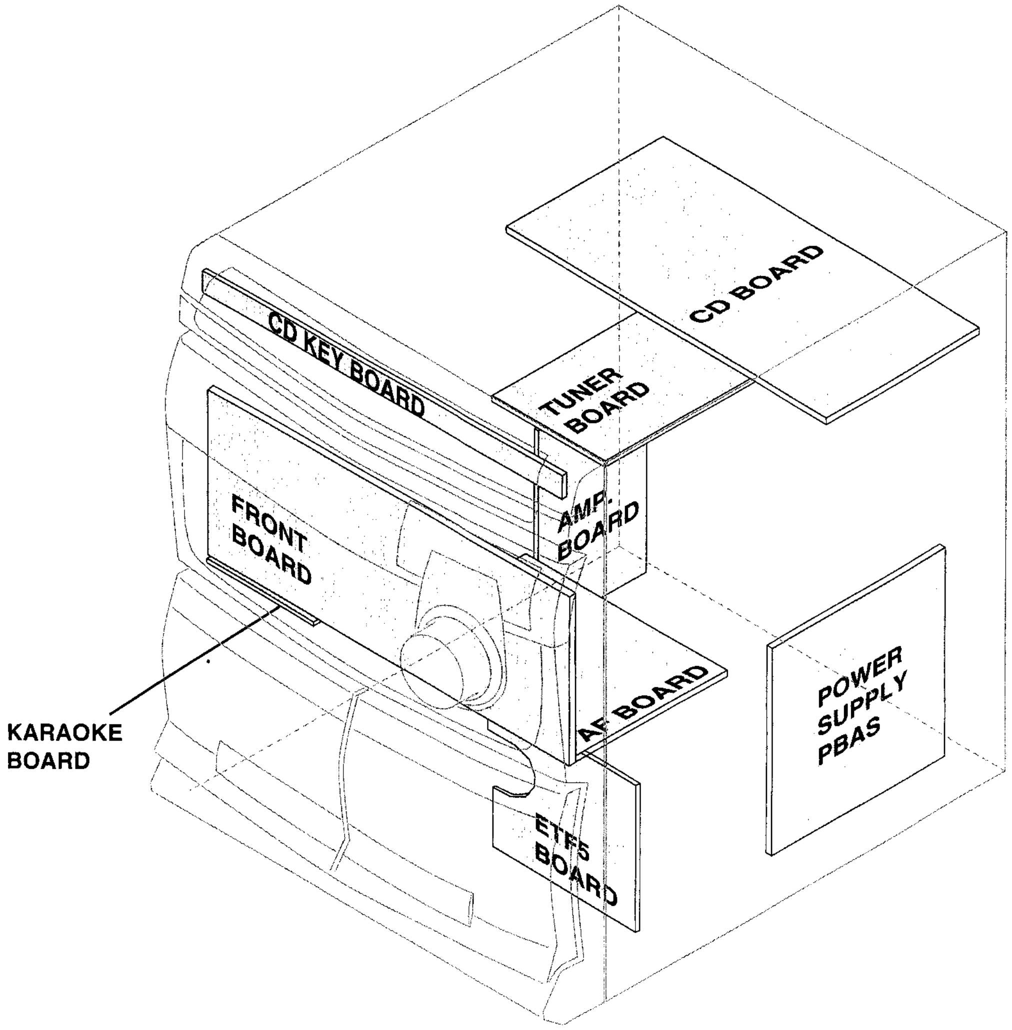
GB 4822 725 25789

PCS 96 926

PHILIPS

LOCATION OF PRINTED CIRCUIT BOARDS


CD BOARD
CD KEY BOARD
TUNER BOARD
AMP. BOARD
FRONT BOARD
AF BOARD
POWER SUPPLY PBAS
ETF5 BOARD
KARAOKE BOARD

VERSION VARIATIONS:

Versions: Features & Board in used:	/21 /21M	/22	/25	/26	/30	/33	/34	/37
Aux Input	x	x						x
Line Output	x	x						x
Subwoofer Output	x	x						x
Surround Output								
Digital Output								
Dolby B								
RDS		x						
CD Text								
Karaoke Feature	x							
Tuner board - ECO5 Sys	x							x
Tuner board - Tuner 95		x						
Tape pc board - ND/DD/FR	x	x						x
Tape pc board - DB/DD/FR								
Power 4 Module (2 Channel)	x	x						x

SPECIFICATIONS

GENERAL:

Mains voltage : 100V for /26
110-127V/220-240V Switchable for /21/21M
120V for /37
220V for /33
220-230V for /22/34
230V for /25
230-240V for /30
Mains frequency : 50/60Hz
Power consumption : < 15W at clock mode FTD on
< 75W at 1/8 rated power out
Clock accuracy : < 4 seconds per day
Dimension centre unit : 265 x 310 x 380mm

TUNER:

FM

Tuning range : 87.5-108MHz
65.81-74MHz for /34
Grid : 50kHz (& 30kHz for /34)
IF frequency : 10.7MHz ± 25kHz
Aerial input : 75ohm coaxial
300ohm click fit for /37
Sensitivity at 26dB S/N : < 7µV
Selectivity at 600kHz bandwidth : > 50dB
Image rejection : > 25dB [> 75dB]
Distortion at RF=1mV, dev. 75kHz : < 3% [< 2%]
-3dB Limiting point : < 7µV
Crosstalk at RF=1mV, dev. 40kHz : > 18dB [> 26dB]

MW

Tuning range : 531-1602kHz
530-1700kHz for /21/21M/37
Grid : 9kHz
10kHz for /21/21M/37
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : < 4.0mV/M
Selectivity at 18kHz bandwidth : > 18dB
IF rejection : > 45dB
Image rejection : > 28dB
Distortion at RF=50mV, m=80% : < 5% [< 7%]

LW

Tuning range : 153-279kHz
Grid : 3kHz
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : [< 7.0mV/M]
Selectivity at 18kHz bandwidth : [> 24dB]
IF rejection : [> 26dB]
Image rejection : [> 35dB]
Distortion at RF=50mV, m=80% : [< 7%]

AMPLIFIER:

Output power (6 ohm, 1kHz, 10% THD) : 2 x 50W ± 1dB

Frequency response within -3dB : 60Hz-16kHz
Dynamic Bass Boost : BEAT, PUNCH, BLAST, DBB Off 1)
Digital Sound Control : Classic,Rock,Techno,Optimal,Jazz 1)
Incredible Surround : IS ON , IS Off 1)

Headphone output at 32 ohm : 16.5mW
Input sensitivity
Aux/Line-in : 350mV ± 2dB at 600 ohm
Mic : 2.5mV ± 2dB at 600 ohm
Output sensitivity
Line-out : 500mV ± 2dB at 22 kohm
Sub-woofer (max. vol.) : 1.5V ± 2dB at 22 kohm

CASSETTE RECORDER:

Number of track : 2 x 2 stereo
Tape speed : 4.76 cm/sec ± 2%
1.6 x 4.76 cm/sec
Wow and flutter : < 0.4% DIN
Fast-wind/Rewind time C60 : 130 sec
Bias system : 75kHz ± 10kHz
Rec/Pb frequency response within 8dB : 80Hz - 12.5kHz
Signal to noise ratio (IEC I) : > 44dB
Signal to noise ratio (IEC II) : > 47dB

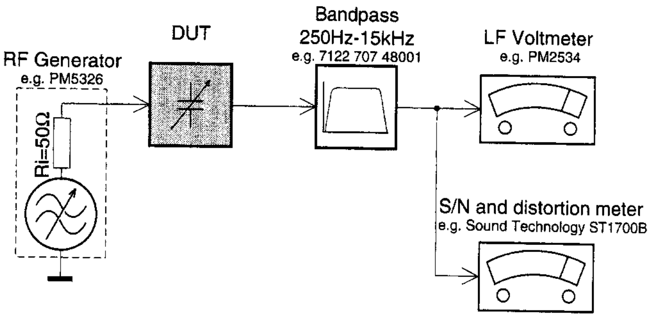
COMPACT DISC:

Measurement done at output conn. of the CDC module.
Frequency response within ± 1.5dB : 20Hz - 20kHz
Output level (in Vrms) : 550mV ± 2dB unloaded
Signal/Noise ratio (A-weighted) : > 80dBA
Distortion at 1kHz : < 0.5%
Channel difference at 1kHz : < 1dB
Channel crosstalk at 1kHz : > 45dB
De-emphasis : 0 or 15/50 mS (Switched by subcode on the disc)

[....] Values indicated are for "Tuner 95 Board" only
1) Frequency response in each setting is software controlled.

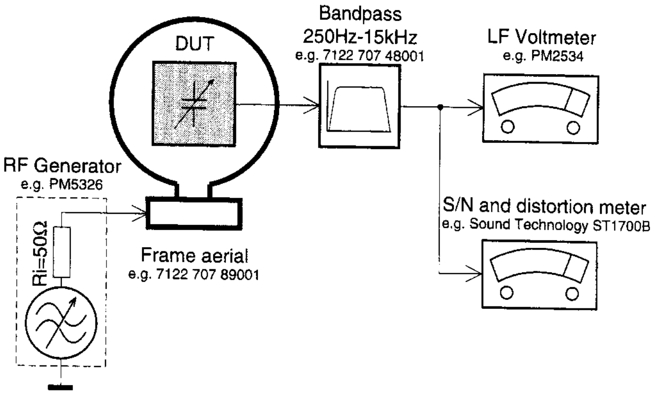
MEASUREMENT SETUP

Tuner FM


Bandpass
250Hz-15kHz
e.g. 7122 707 48001
DUT
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
S/N and distortion meter
e.g. Sound Technology ST1700B

Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

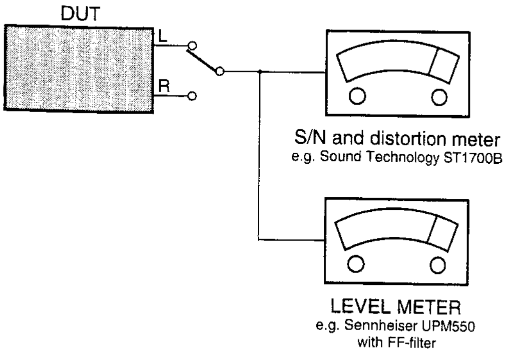
Tuner AM (MW,LW)


Bandpass
250Hz-15kHz
e.g. 7122 707 48001
DUT
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
Frame aerial
e.g. 7122 707 89001
S/N and distortion meter
e.g. Sound Technology ST1700B

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

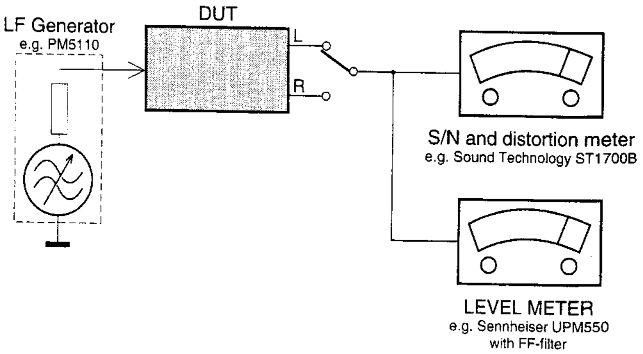
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)


DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071


LF Generator
e.g. PM5110
DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

SERVICE AIDS

Service Tools:

Universal Torx driver holder	4822 395 91019
Torx bit T10 150mm	4822 395 50456
Torx driver set T6 - T20	4822 395 50145
Torx driver T10 extended	4822 395 50423

Cassette:

SBC419 Test cassette CrO2	4822 397 30069
SBC420 Test cassette Fe	4822 397 30071
MTT150 Dolby level 200nWb/M	4822 397 30271

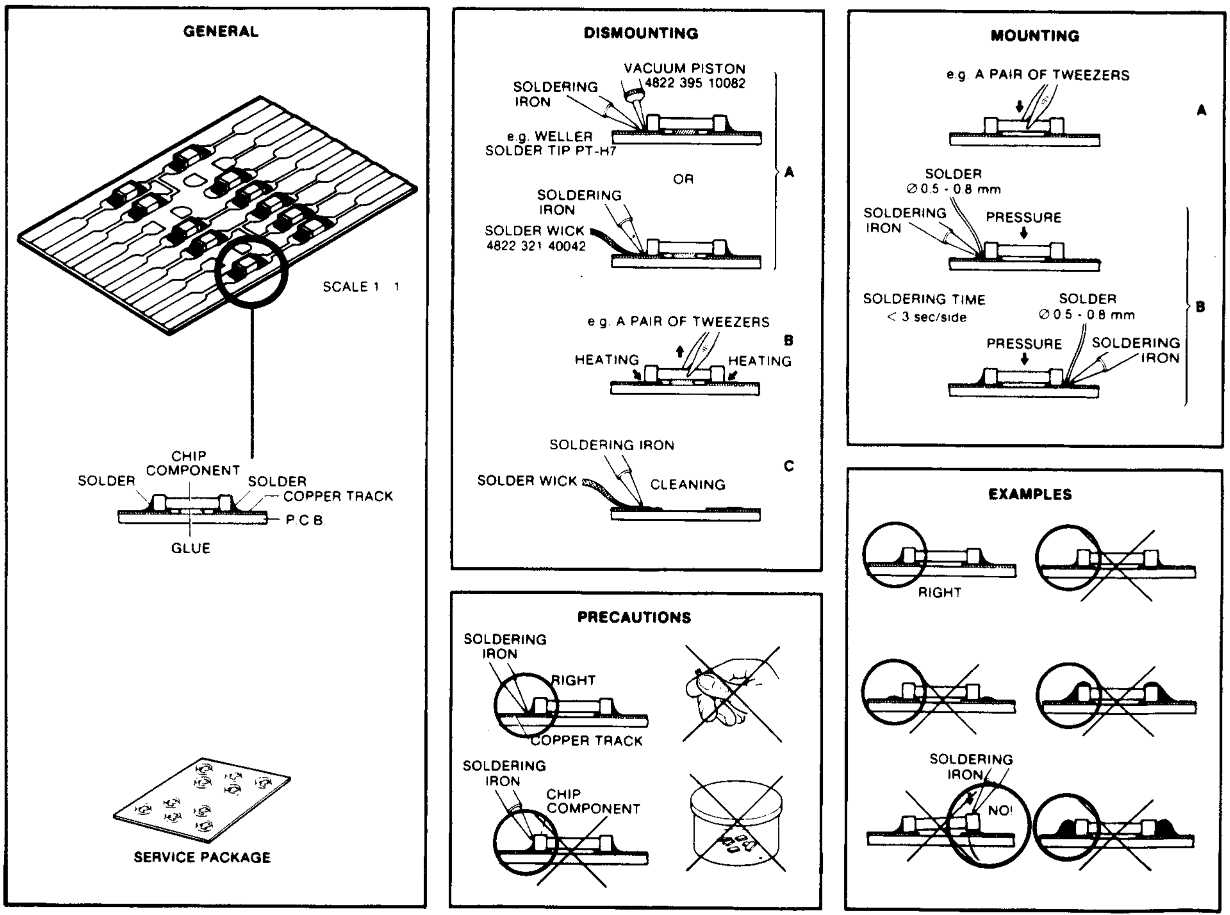
Compact Disc:

SBC426/426A Test disc 5 + 5A	4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz	4822 397 30155
SBC429 Audio Signals disc	4822 397 30184
Dolby Pro-logic Test Disc	4822 395 10216

ESD Equipment:

Anti-static table mat - large 1200x650x1.25mm	4822 466 10953
Anti-static table mat - small 600x650x1.25mm	4822 466 10958
Anti-static wristband	4822 395 10223
Connector box (1MΩ)	4822 320 11307
Extension cable (to connect wristband to conn. box)	4822 320 11305
Connecting cable (to connect table mat to conn. box)	4822 320 11306
Earth cable (to connect product to mat or box)	4822 320 11308
Complete kit ESD3 (combining all above products)	4822 320 10671
Wristband tester	4822 344 13999

HANDLING CHIP COMPONENTS


GENERAL
SCALE 1 : 1
CHIP COMPONENT
SOLDER
SOLDER
COPPER TRACK
P C B
GLUE
SERVICE PACKAGE
DISMOUNTING
VACUUM PISTON
4822 395 10082
SOLDERING IRON
e.g. WELLER SOLDER TIP PT-H7
OR
A
SOLDERING IRON
SOLDER WICK
4822 321 40042
e.g. A PAIR OF TWEEZERS
B
HEATING
HEATING
SOLDERING IRON
C
SOLDER WICK
CLEANING
MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER
∅ 0.5 - 0.8 mm
SOLDERING IRON
PRESSURE
SOLDERING TIME
< 3 sec/side
SOLDER
∅ 0.5 - 0.8 mm
B
PRESSURE
SOLDERING IRON
PRECAUTIONS
SOLDERING IRON
RIGHT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT
EXAMPLES
RIGHT
SOLDERING IRON
NO!

27 012C12

ESD

GB WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

F ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

D WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

NL WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

I AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

GB

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

NL

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

F

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les piéces de rechange identiques à celles spécifiées.

D

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Original zustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

I

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

CLASS 1
LASER PRODUCT
3122 110 03420

GB Warning !

Invisible laser radiation when open.
Avoid direct exposure to beam.

S Varning !

Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

SF Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

DK Advarse !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

GENERAL INFORMATION

General Information

- ***The typeplate (which contains the serial number) is located at the rear of the system.***
- ***Recording is permissible if copyright or other rights of third parties are not infringed.***

Environmental Information

All unnecessary packaging material has been omitted. We have done our utmost to make the packaging easily separable into three mono-materials: cardboard (box), polystyrene foam (buffer) and polythene (bags, protective foam sheet).

Your system consists of materials which can be recycled and reused if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packaging materials, exhausted batteries and old equipment.

Accessories (Supplied)

- Remote control
- Batteries (2 x AAA size) for remote control
- AM loop antenna
- FM antenna wire
- AC power cord

Accessories (Recommended)

- Philips FB 201 active subwoofer.
- Philips FB 202W wireless active subwoofer.

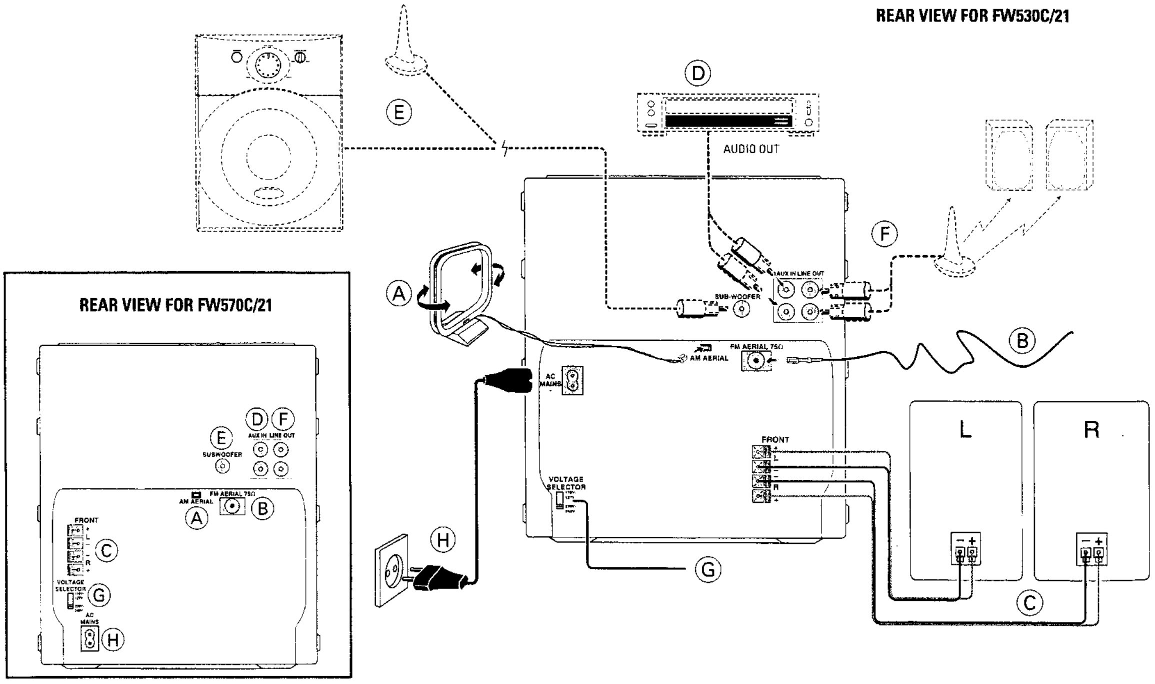
SAFETY INFORMATION

Safety Information

- Before operating the system, check that the operating voltage indicated on the typeplate (or the voltage indication beside the voltage selector) of your system is identical with the voltage of your local power supply. If not, please consult your dealer. The type plate is located at the rear of your system.
- When the system is switched on, do not move it around.
- Place the system on a solid base (e.g. a cabinet).
- Place the system in a location with adequate ventilation to prevent internal heat build-up in your system.
- Do not expose the system to excessive moisture, rain, sand or heat sources.
- Under no circumstances should you repair the system yourself, as this will invalidate the warranty!
- If the system is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lens of the CD unit inside the system. Should this occur, the CD player will not operate normally. Leave the power on for about one hour with no disc in the system until normal playback is possible.
- Electrostatic discharge may cause unexpected problems. See whether these problems disappear if you unplug the AC power cord and plug it in again after a few seconds.
- **To disconnect the system from the power supply completely, remove the AC power plug from the wall socket.**

PREPARATION

Rear Connections



PREPARATION

Ⓐ AM Antenna Connection

Connect the supplied loop antenna to the AM AERIAL terminal. Place the AM loop antenna far away from the system and adjust its position for the best reception.

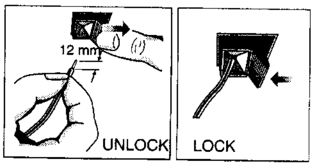
Ⓑ FM Wire Antenna Connection

Connect the supplied FM wire antenna to the FM 75 Ω terminal. Adjust the position of the FM antenna for the best reception.

Outdoor Antenna
For better FM stereo reception connect an outdoor FM antenna to the FM AERIAL 75 Ω terminal using a 75 Ω coaxial wire.

Ⓒ Speaker Connections

- Connect the right speaker to Front terminal R, with the red wire to + and the black wire to –.
- Connect the left speaker to Front terminal L, with the red wire to + and the black wire to –.
- Clip the stripped portion of the speaker wire as shown.


12 mm
UNLOCK
LOCK

Ⓓ Connecting other equipment to your system

You can connect the audio left and right OUT terminals of a TV, VCR, Laser Disc or DVD player to the AUX IN terminal at the rear of the system.

Ⓔ Subwoofer Out Connection

You can connect either an optional active subwoofer (recommended model FB 201) or an optional wireless active subwoofer (recommended model FB 202W) to the SUBWOOFER OUT terminal. The wireless system uses a radio frequency transmitter. The subwoofer reproduces just the low bass effect (e.g. explosions, the rumble of spaceships, etc.). Be sure to follow the instructions supplied with the subwoofer.

Ⓕ Line Out *(wireless ready)*

You may install additional front active speakers away from the system (e.g. in another room) to reduce the inconvenience of running long speaker wires across rooms. You can place as many remote speakers as you like provided that they operate at the same radio frequency. Connect the wireless radio frequency transmitter to the LINE OUT terminals. Place the active speakers at your preferred location. Be sure to follow the instructions supplied with the active speakers.

Note:
- *Availability of wireless transmitter and its peripherals are subjected to the approval of local authorities. Please check with respective local safety or approving authority.*

Ⓖ Adjusting the Operating Voltage

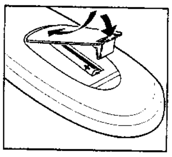
(not available for version /30)

Before connecting the AC power cord to a wall outlet, make sure that the voltage selector at the rear of the system is set to the local power line voltage. If not, reset the selector before connecting to the wall outlet.

Ⓗ AC Power Supply

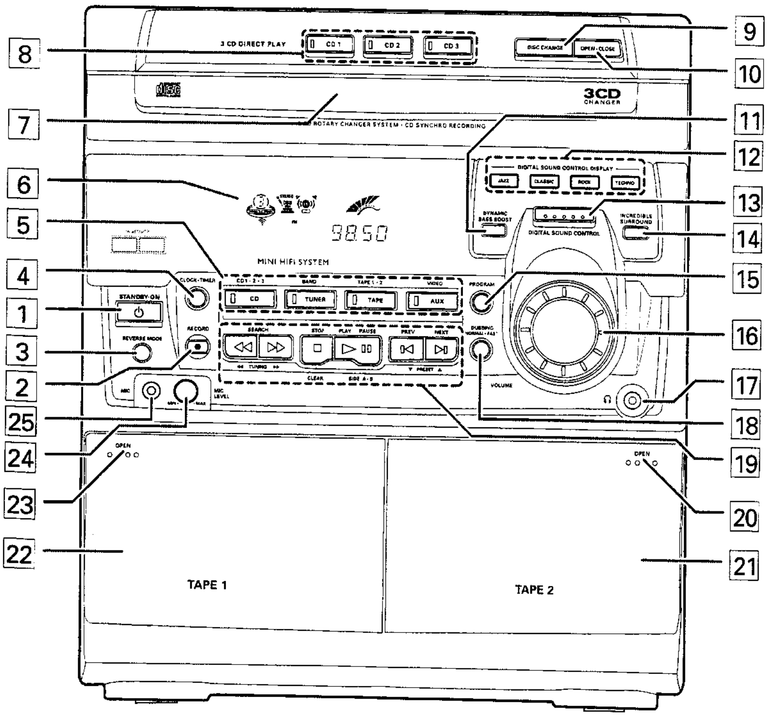
After all other connections have been made, connect the AC power cord to the system and to the wall outlet.

Inserting batteries into the Remote Control



- Insert the batteries (Type R03 or AAA) into the remote control as shown in the battery compartment.
- To avoid damage from possible battery leakage, remove dead batteries or batteries that will not be used for a long time. For replacement, use type R03 or AAA batteries.

CONTROLS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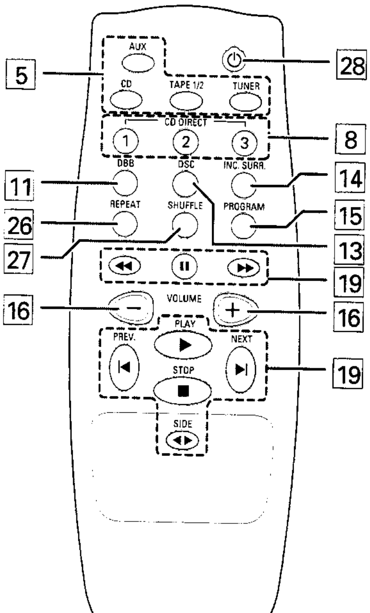
16
17
18
19
20
21
3 CD DIRECT PLAY
CD 1
CD 2
CD 3
DISC CHANGE
OPEN•CLOSE
3CD CHANGER
ROTARY CHANGER SYSTEM • CD SYNCHRO RECORDING
DIGITAL SOUND CONTROL DISPLAY
JAZZ
CLASSIC
ROCK
TECHNO
DYNAMIC BASS BOOST
INCREDIBLE SURROUND
DIGITAL SOUND CONTROL
MINI HIFI SYSTEM
CLOCK•TIMER
STANDBY•ON
REVERSE MODE
RECORD
CD 1•2•3
BAND
TAPE 1•2
VIDEO
CD
TUNER
TAPE
AUX
PROGRAM
SEARCH
STOP
PLAY
PAUSE
PREV
NEXT
TUNING
CLEAR
SIDE A•B
PRESET
DUBBING NORMAL•FAST
VOLUME
MIC
MIC LEVEL
OPEN
TAPE 1
TAPE 2


5
11
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16
19
AUX
CD
TAPE 1/2
TUNER
CD DIRECT
1
2
3
DBB
DSC
INC. SURR.
REPEAT
SHUFFLE
PROGRAM
VOLUME
PLAY
PREV.
NEXT
STOP
SIDE

CONTROLS

Controls on the system and remote control

1 **STANDBY•ON**
- to switch the system on or to standby mode.
- to store radio stations automatically by pressing and holding for 2 seconds *(only in Standby or Demonstration mode)*.

2 **RECORD**
- to start recording on tape deck 2 only.

3 **REVERSE MODE**
- to select the different playback mode on tape deck 2 only.

4 **CLOCK•TIMER**
- to view clock, set clock or timer.

5 **SOURCE SELECTION**
- to select the following:

CD (CD 1•2•3) .... to select CD mode. When in CD stop mode; to select respective disc tray.
TUNER (BAND) .... to select Tuner mode. When in Tuner mode; to select the waveband: FM or MW.
TAPE (TAPE 1•2) ..... to select Tape mode. When in tape stop mode; to select either tape deck 1 or tape deck 2.
AUX (VIDEO) .... to select external source (e.g. DVD, TV, Laser Disc or VCR sound).

6 **DISPLAY**
- to view the current setting of the system.

7 **CD CAROUSEL TRAY**

8 **3 CD DIRECT PLAY**
- to select a CD tray for playback.

9 **DISC CHANGE**
- to change CD(s).

10 **OPEN•CLOSE**
- to open or close the CD carousel tray.

11 **DYNAMIC BASS BOOST (DBB)**
- to select bass boost level (Beat, Punch, Blast).

12 **DIGITAL SOUND CONTROL DISPLAY PANEL**
- to view the selected DSC setting.

13 **DIGITAL SOUND CONTROL (DSC)**
- to select the desired sound effect : OPTIMAL, JAZZ, CLASSIC, ROCK or TECHNO.

14 **INCREDIBLE SURROUND**
- to switch on or off the surround sound effect.

15 **PROGRAM**
- to program CD tracks in CD mode or preset radio stations in tuner mode.

16 **VOLUME**
- to adjust the volume level.

17 **HEADPHONES** 🎧
- to connect headphones jack.

18 **DUBBING**
- to dub a tape in normal or high speed.

19 **MODE SELECTION**

◀◀ SEARCH ▶▶ (◀◀ TUNING ▶▶)
for CD .... to search backward/forward.
for TUNER ... to tune to a lower or higher radio frequency.
for TAPE ...... to rewind or fast forward on tape deck 2 only.

STOP ■ (CLEAR)
for CD .... to stop CD playback or clear a program.
for TUNER ... to stop programming.
for TAPE ...... to stop playback or recording.

PLAY ▶ / PAUSE ❚❚ (SIDE A•B)
for CD .... to start or interrupt playback.
for TAPE ...... to start playback; When playing in tape 2 mode, to change side.

PREV ◀◀ / NEXT ▶▶❘ (▼ PRESET ▲)
for CD .... to skip to the beginning of the current or previous/next track.
for TUNER ... to select a preset radio station in memory.

20 **OPEN**
- to open tape deck 2.

21 **TAPE DECK 2**

22 **TAPE DECK 1**

23 **OPEN**
- to open tape deck 1.

24 **MIC LEVEL** *(not available for version /30)*
- to adjust the mixing level for karaoke or microphone recording.

25 **MIC** *(not available for version /30)*
- to connect microphones jack.

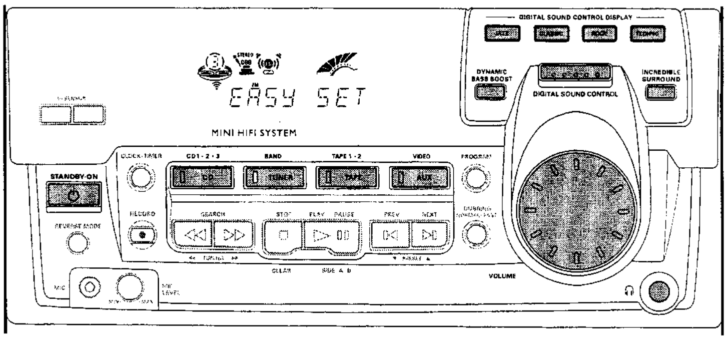
26 **REPEAT**
- to repeat a CD track.

27 **SHUFFLE**
- to play all the available discs and their tracks in random order.

28 ⏻
- to switch the system to standby mode.

Notes for remote control:
- *First select the source you wish to control by pressing one of the source select buttons on the remote control (e.g. CD, TUNER, TAPE 1/2 or AUX).*
- *Then select the desired function (PLAY, NEXT, etc.).*

OPERATING THE SYSTEM



Important:
Before you begin operating the system, complete the preparation procedures.

Demonstration mode

The system has a demonstration mode that shows the various features offered by the system. ***Whenever the system is switched on from the wall socket, the demonstration mode will start automatically.***

Notes:
- *During demonstration mode, if you press any source (or standby-on) button, the system will switch to the respective (or standby) mode.*
- *When the system is switched to standby mode, 5 seconds later, the demonstration mode will begin again.*

To cancel demonstration mode
- Press and hold **STOP ■** *(on the system only)* for ***3 seconds*** to stop the demonstration.
  → The demonstration mode will be switched off permanently.

Easy Set *(only in Standby or Demonstration mode)*

EASY SET allows you to store all available radio stations in a particular band (FM•MW) automatically (see Easy Set under Tuner).

Switching the system ON

- Press **STANDBY•ON** *(on the system only)*, **CD**, **TUNER**, **TAPE** or **AUX**.

You can also switch on the system by pressing any one of the 3 CD DIRECT PLAY buttons.

Switching the system to standby mode

- Press **STANDBY•ON** again.

Selecting the Source

- Press the respective source selection button: **CD**, **TUNER**, **TAPE** or **AUX**.
  → The display indicates the selected source.

Note:
- *For an external source, make sure you have connected the audio left and right OUT terminals of the external equipment (TV, VCR, Laser Disc or DVD player) to the AUX IN terminals.*

Sound Control

VOLUME ADJUSTMENT

Adjust **VOLUME** to increase or decrease the sound level.

For Personal Listening

Connect the headphones plug to the 🎧 socket at the front of the system. The speakers will be muted.

INCREDIBLE SURROUND

Normal stereo sound is determined by the distance between the front speakers. When Incredible Surround is switched on, it magnifies the virtual distance between the front speakers for an incredibly wide, enveloping, stereo effect.

- Press **INCREDIBLE SURROUND** to switch on.
  → The INCREDIBLE SURROUND button lights up.
  → "IS" will be displayed.

To switch off Incredible Surround

- Press **INCREDIBLE SURROUND** again.'
  → The INCREDIBLE SURROUND button light is switched off.
  → "IS OFF" will be displayed.

DIGITAL SOUND CONTROL (DSC)

The DSC feature enables you to enjoy special sound effects that have preset equalizer settings, providing the best music reproduction.

- Press **DIGITAL SOUND CONTROL (DSC)** to select **OPTIMAL**, **JAZZ**, **CLASSIC**, **ROCK** or **TECHNO**.
  → The Digital Sound Control display panel will light up respectively. At OPTIMAL setting, the DSC display panel does not light up.
  → "OPTIMAL, JAZZ, CLASSIC, ROCK or TECHNO" will be displayed.

Automatic DSC-DBB selection

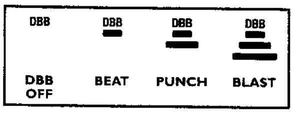
The best setting for the DBB is automatically generated for the respective DSC selection. You can also manually select the DBB setting that best suits your listening environment.

DSC Selection		DBB Selection
Optimal	←→	Punch
Jazz	←→	Punch
Classic	←→	Beat
Rock	←→	Blast
Techno	←→	Blast

DYNAMIC BASS BOOST (DBB)

The DBB mode enhances the bass response.

- Press **DBB** briefly to select the various level of bass boost.
  → The DBB button lights up.
  → "BEAT, PUNCH or BLAST" will be displayed.


DBB
DBB
DBB
DBB
DBB OFF
BEAT
PUNCH
BLAST

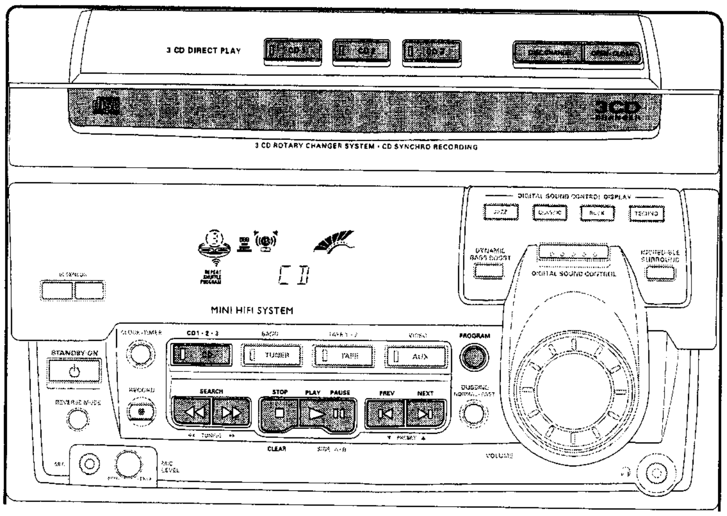
To switch off DBB

- Press **DBB** briefly until the DBB button light is switched off.
  → "DBB OFF" will be displayed.

Note:

– *Some CDs or tapes might be recorded in high modulation. It may cause distortion at high volume. If this occurs, switch off Incredible Surround (if available), DBB level or reduce the volume.*

CD


3 CD DIRECT PLAY
3CD CHANGER
3 CD ROTARY CHANGER SYSTEM · CD SYNCHRO RECORDING
DIGITAL SOUND CONTROL DISPLAY
DYNAMIC BASS BOOST
DIGITAL SOUND CONTROL
REPEAT SHUFFLE PROGRAM
MINI HIFI SYSTEM
STANDBY·ON
REVERSE MODE
RECORD
CD1 · 2 · 3
CD
TUNER
TAPE
AUX
PROGRAM
SEARCH
STOP
PLAY
PAUSE
PREV
NEXT
CLEAR
VOLUME
MIC
MIC LEVEL

Warning!

1) This system is designed for conventional CDs. Do not use any accessories like disc stabilizer rings or CD treatment sheets, etc., which may damage the CD mechanism.

2) Do not load more than one disc into each tray.

3) When the CD changer is loaded with CD(s), do not turn over or shake the system. This may jam the changer.

You can load up to three discs in the CD changer for continuous playback without interruption.

Loading the CD Changer

1. Press **CD** to select CD mode.
2. Press **OPEN•CLOSE**.
   → The CD compartment slides out.
3. Load a CD with the printed side up in the right tray.
   - You can load another disc in the left tray.
   - To load the third disc, press **DISC CHANGE**.
     → The CD changer carousel will rotate until the empty tray is at the right hand side and is ready for loading.
     → Playback will always start with the disc in the outer right disc tray.
4. Press **OPEN•CLOSE** to close the CD compartment.
   → The total number of tracks and playing time of the last selected disc appear on the display.

3 CD Direct Play

- You can play a CD directly by pressing the corresponding **3 CD DIRECT PLAY (1 - 3)** button. The CD player will stop at the end of playback of the selected disc.
  → When the button is lighted, it indicates that there is a disc loaded in the disc tray.

Playing a CD

1 Press **PLAY ▶** to start playback.
  → The disc tray, track number and elapsed playing time of the current track appear on the display.
  → The LED on the respective 3 CD Direct Play button will be flashing.
- To interrupt playback, press **PAUSE II** .
  → The playing time flashes.
- To resume playback, press **PLAY ▶** again.

2 To stop playback, press **STOP ■** .

Note:
– *All the available discs will be played once, then stop. When the CD has stopped playing, the system will switch to the standby mode after 15 minutes if no button is pressed.*

Disc Change

You can change the outer 2 discs while the third inner disc is at the stop or playback mode.

1 Press **DISC CHANGE**.
  → The CD compartment slides out.
2 Replace the discs in the left and right disc trays.
- If you press **DISC CHANGE** again during playback, the CD will stop playing.
  → The CD carousel tray will rotate until the inner tray is at the right hand side and is ready for changing.

3 Press **OPEN•CLOSE** to close the CD compartment.

Selecting a desired track

Selecting a desired track at the stop mode

1 Press **PREV I◀** or **NEXT ▶I** until the desired track appears on the display.
2 Press **PLAY ▶** to start playback.
  → The selected track number and elapsed playing time appear on the display.

Selecting a desired track during playback

1 Press **PREV I◀** or **NEXT ▶I** until the desired track appears on the display.
  → The selected track number and elapsed playing time appear on the display.
- If you press **PREV I◀** once it will skip to the beginning of the current track and play the track again.

Searching for a particular passage during playback

- Press and hold **◀◀** or **▶▶** until the desired passage is located.
  → The volume will be reduced.
- Playback returns to normal when **◀◀** or **▶▶** is released.

Programming Tracks

Programming tracks of a loaded CD is possible in the stop mode. The display will indicate the total tracks stored in the program. Up to 40 tracks can be stored in the memory in any order. When 40 tracks are stored and you attempt to store another track, the display will show "PROGRAM FULL".

1 Load the desired discs in the disc trays.
2 Press **PROGRAM** to start programming.
  → The PROGRAM flag starts flashing
3 Press the **CD (CD 1•2•3)** to select the desired disc.
4 Press **PREV I◀** or **NEXT ▶I** to select the desired track.
5 Press **PROGRAM** to store the track.
- Repeat steps ***3*** to ***5*** to store other discs and tracks.

6 Press **STOP ■** once to end programming mode.
  → The total number of tracks programmed and total playing time appear on the display.

Notes:
– *If the total playing time is more than "99:59" or if one of the programmed tracks has a number greater than 30, then "- - : - -" appears in the display instead of the total playing time.*

– *During programming, If no button is pressed within 20 seconds, the system will exit program mode automatically.*

Playing the program

1 Press **PLAY ▶** to start program playback.
  → "PLAY PROGRAM" will be displayed.
  → The track number and elapsed playing time of the current track will appear on the display.
2 Press **STOP ■** to stop program playback.

Note:
– *If you press any of the 3 CD DIRECT PLAY buttons, the system will play the selected disc or track and the stored program will be ignored temporarily. The PROGRAM flag will also temporarily disappear from the display and then reappear, when the playback for the selected disc ends.*

Reviewing the program

Reviewing of the program is only possible in the stop mode.

- Press **PREV I◀** or **NEXT ▶I** repeatedly to review the programmed tracks.
- Press **STOP ■** to exit review mode.

Erasing the program *(in the stop mode)*

- Press **CLEAR** on the system.
  → "PROGRAM CLEARED" will be displayed.

Note:
– *The program will be erased when the system is disconnected from the power supply. If the CD carousel is opened, the tracks belonging to the outer two trays will be erased and the display will show "CLEARED".*

Shuffle *(only on remote control)*

It will play all the available discs and their tracks in random order. Shuffle may also be used when tracks are programmed.

To shuffle all the discs and tracks

1 Press **SHUFFLE**.
  → "SHUFFLE" will be displayed.
  → The SHUFFLE flag, the disc and the track selected at random appear on the display.
- The discs and the tracks will now be played in random order until you press **STOP ■** .

2 Press **SHUFFLE** again to resume normal playback.
  → The SHUFFLE flag disappears from the display.

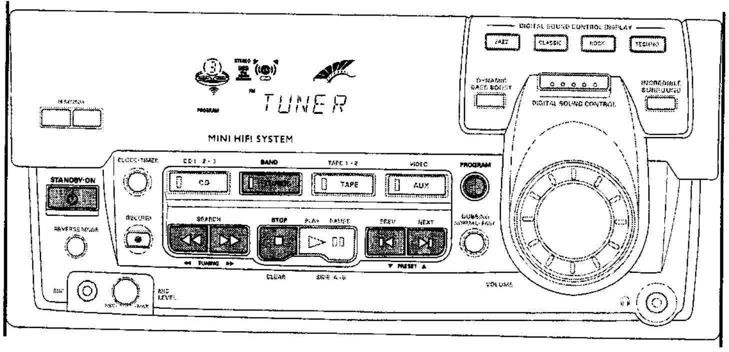
Note:
– *All the available discs will be played once, then stop.*

Repeat *(only on remote control)*

It will play the current track repeatedly.

1 Press **REPEAT** during playback.
  → "REPEAT TRACK" will be displayed.
  → The REPEAT flag and the track selected appear on the display.
- The track will now be played repeatedly until you press **STOP ■** .

2 Press **REPEAT** again to resume normal playback.
  → The REPEAT flag disappears from the display.



Easy Set *(only in Standby or Demonstration mode)*

EASY SET allows you to store all available radio stations in a particular band (FM•MW) automatically.

- Press and hold **STANDBY•ON** *(on the system only)* for 2 seconds.
  → "EASY SET" will be displayed and followed by "TUNER".
  → Easy set will start with the last active band.
  → All available radio stations with sufficient signal strength will be stored until 40 presets are filled.

Notes :
- *When EASY SET is used, all previously stored stations will be erased.*
- *The last preset station will appear on the display when Easy Set is completed.*

Tuning to Radio Stations

1 Press **TUNER** to select TUNER mode.
   → "TUNER" will be displayed.
   → The preset station number, frequency and waveband appear on the display.
2 Press **TUNER (BAND)** again to select the desired waveband : FM or MW.
3 Press **TUNING** ◀◀ or ▶▶ for more than one second, then release.
   → The display will show "SEARCH" until a radio station with sufficient signal strength is found.

- Repeat this procedure until the desired radio station is reached.
- To tune to a weak station, briefly press **TUNING** ◀◀ or ▶▶ until the display shows the desired frequency and/or when the best reception has been obtained.

Storing Preset Radio Stations

You can store up to 40 radio stations in the memory. When a preset radio station is selected, the preset number appears next to the frequency on the display.

Automatic programming

1 Press **TUNER**.
2 Press **TUNER (BAND)** again to select the desired waveband : FM or MW.
3 Press **PROGRAM** for more than one second.
   → PROGRAM flag starts flashing and 'AUTO' will be displayed.
   → Every available radio station will be stored automatically. The frequency and preset number will be displayed briefly.
   → The system will stop searching when all the available radio stations are stored or when the memory for 40 preset radio stations is used.
   → The system will remain tuned to the last stored preset radio station.

- Repeat the above procedure to store other preset stations for the other waveband. Remember to select the next available preset number before proceeding. If not, some of the preset radio stations may be erased.

Notes:
- *You can cancel the automatic programming by pressing PROGRAM or STOP* ■ .
- *If you want to reserve a section of preset numbers, for example preset numbers 1 to 9, select preset 10 before starting automatic programming: now only the preset numbers 10 to 40 will be programmed.*

Manual programming

1 Press **TUNER**.
2 Press **TUNER (BAND)** to select the desired waveband : FM or MW.
3 Press **PROGRAM** for less than one second.
   → PROGRAM flag, the frequency and preset station number start flashing.
   → The next available preset number will be displayed for selection.
4 Press **TUNING** ◀◀ or ▶▶ to tune to the desired frequency.

- When all 40 presets are stored, no preset number is shown.
  → The message "PROGRAM FULL" will be displayed.
- If you wish to store the radio station to another preset number, press **PRESET** ▼ or ▲ to select the desired preset number.

5 Press **PROGRAM** again.
   → PROGRAM flag will stop flashing, and the radio station will be stored.

- Repeat the above procedure to store other preset radio stations.

Notes:
- *You can cancel the manual programming by pressing STOP* ■ .
- *During programming, If no button is pressed within 20 seconds, the system will exit program mode automatically.*

Tuning to Preset Radio Stations

- Press **PRESET** ▼ or ▲ to select the desired preset number.
  → The preset number, frequency and waveband appear on the display.

Changing the MW tuning grid

(not available for version /30)

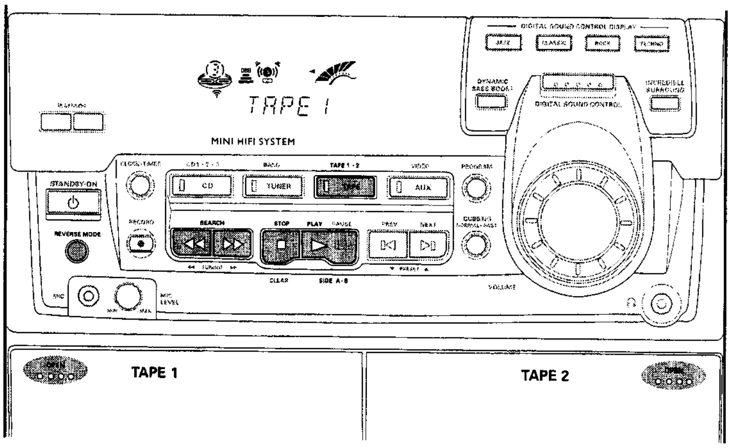
The frequency step can be changed if necessary. In North and South America, the frequency step between adjacent channels in the MW band is 10 kHz. In other parts of the world, it is 9 kHz. The frequency step presetted in the factory is 9 kHz.

For MW band
To change from 9 kHz to 10 kHz or vice versa

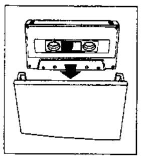
Changing of tuning grid will erase all previously stored preset stations.

1 Disconnect the system from the AC power supply *(pull out the AC power cord).*
2 Press **TUNER** and **TUNING** ▶▶ depressed while reconnecting the system to the AC power supply.
   → Display will show "TUNER" and follow by "GRID 9" or "GRID 10".

Notes:
- *GRID 9 indicates that the tuning grid is in step of 9 kHz in MW band. GRID 10 indicates that the tuning grid is in step of 10 kHz in MW band.*
- *FM tuning grid will also be changed from 50 kHz to 100 kHz or vice versa. All preset radio stations will also be erased.*



Loading a tape



- Press **OPEN**.
- The tape deck door opens.
- Load the tape with the open side downward and the full spool to the left.
- Close the tape deck door.

Tape Playback

1 Press **TAPE** to select TAPE mode.
→ "TAPE 1" or "TAPE 2" will be displayed.
- Press **TAPE** again to select either tape deck 1 or tape deck 2.

2 Load the tape into the desired tape deck.
3 Press **PLAY ▶** to start playback.
3a *(For Tape Deck 2 only)*
Press **SIDE A•B** to switch playback between sides A and B.
→ The ◀ or ▶ (back or front) flag appears on the display, depending on the side selected.
3b *(For Tape Deck 2 only)*
Press **REVERSE MODE** to select the different type of playback mode *(see auto reverse playback)*.
4 Press **STOP ■** to end playback.

Notes:
- *To change side before playback begins, use the SIDE button on the remote control.*
- *When the tape has stopped playing, the system will switch to the standby mode automatically after 15 minutes if no button is pressed.*

Auto Reverse Playback *(only on tape deck 2)*

- Press **REVERSE MODE** to select the different playback modes.

⇀	recording or playback on one side of the tape. The tape stops at the end of one side.
⊃	recording or playback on both sides of the tape. The tape then stops.
⊂⊃	continuous playback on both sides of the tape up to a maximum of 20 times per side unless you press **STOP ■**.

TAPE

Rewind/Fast Forward *(only on tape deck 2)*

At the stop mode

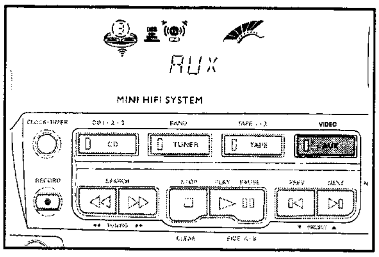
1 You can rewind or fast forward the tape by pressing ◀◀ or ▶▶ respectively.
→ "⟪ or ⟫" will be displayed depending on which button is pressed.
→ The tape will stop automatically at the end of the rewinding or fast forwarding.
2 Press **STOP ■** to stop rewind or fast forward.

During playback

- Press and hold ◀◀ or ▶▶ respectively until the desired passage is located.
→ During searching, the sound is reduced to a low volume.
→ When you release ◀◀ or ▶▶, the tape continues playing.

Notes:
- *During rewinding or fast forwarding of a tape, it is possible to select another source (e.g. CD, TUNER or AUX).*
- *Check and tighten slack tape with a pencil before use. Slack tape may get jammed or may burst in the mechanism.*
- *C-120 tape is extremely thin and is easily deformed or damaged. It is not recommended for use in this system.*
- *Store the tapes at room temperature and do not put them too close to a magnetic field (for example, a transformer, TV or loudspeaker boxes).*

AUX



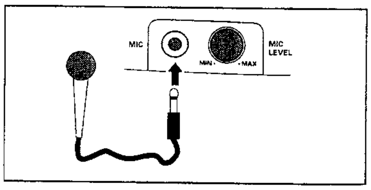
Selecting External Equipment

If you have connected the audio out terminals of the external equipment (TV, VCR, Laser Disc or DVD player) to the AUX IN terminals, you can hear the sound from the system.

- Press **AUX** to select the external mode.
→ "AUX" will be displayed.

Note:
- *All the sound control features (e.g. DSC, DBB, etc.) are available for selection.*

KARAOKE



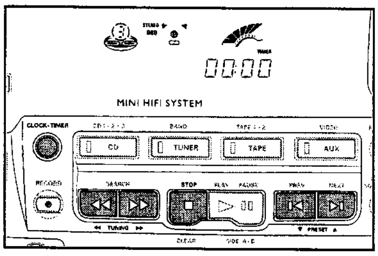
Karaoke *(not available for version /30)*

Microphone mixing

1 Set the **MIC LEVEL** control to the minimum level to prevent acoustic feedback (e.g. a loud howling sound) before you connect the microphone.
2 Connect a microphone to the **MIC** socket.
3 Press **CD**, **TUNER**, **TAPE** or **AUX**.
4 Play the selected source.
5 Adjust the volume level with **VOLUME** control.
6 Adjust the **MIC LEVEL** control to the mixing level that you want.
7 Start singing or talking through the microphone.

Note:
- *It is advisable to switch off Incredible Surround during karaoke.*

CLOCK TIMER



View Clock

You can view the clock (if it is set) at standby or any source mode. It will be displayed for about 7 seconds.

- Press **CLOCK•TIMER** briefly.
  → " *10:25* " (the current time) will be displayed.
  → " *- - : - -* " will be displayed if the clock is not set.

Clock setting

The clock is set in 24-hour mode, e.g. *00:00* or *23:59*. Before setting the clock, you must be at the View Clock mode.

1 Press **CLOCK•TIMER** to select clock mode.
  → "*00:00*" or the current time starts flashing.
  → "◀◀ , ▶▶ , |◀ , ▶|" light up.
2 Set the hour with ◀◀ or ▶▶.
3 Set the minute with |◀ or ▶|.
4 Press **CLOCK•TIMER** again to store the setting.
  → The clock starts running.
- To exit without storing the setting, press **STOP ■**.

Notes:
- *During clock setting, if no button is pressed within 90 seconds, the system will exit clock setting mode automatically.*
- *When power interruption occurs, the clock setting is erased.*

Timer Setting

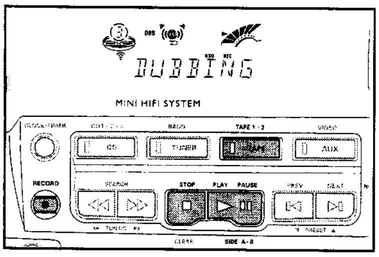
- The system can switch on to CD, TUNER or TAPE 1 mode automatically at a preset time. It can serve as an alarm to wake you up. After half an hour from the preset time, the system will return to the standby mode if no button is pressed.
- Before setting the timer, make sure the clock is set correctly.
- The timer has to be reset or start again for each subsequent preset time.
- **The volume of the timer will be at the last setting before the system is switched to standby mode**.

1 Press and hold **CLOCK•TIMER** for more than 2 seconds to select timer mode.
  → "*ON 00:00*" or the last set timer starts flashing. The TIMER flag will be displayed.
  → The last selected source is lighted while other available sources are flashing.
  → "◀◀ , ▶▶ , |◀ , ▶|" light up.
2 Press **CD**, **TUNER** or **TAPE** to select the desired source.
3 Press ◀◀ or ▶▶ to set the hour for the timer to start.
4 Press |◀ or ▶| to set the minute for the timer to start.
5 Press **CLOCK•TIMER** again to store the start time and the selected source.
  → The TIMER is now set.
  → The TIMER flag remains on the display.
- At the preset time, the TIMER will be activated.
  → The selected source will be played.
  → The TIMER flag disappears from the display.

Notes:
- *During timer setting, if no button is pressed within 90 seconds, the system will exit timer setting mode automatically.*
- *If the source selected is TUNER, the last tuned frequency will be switched on.*
- *If the source selected is CD, playback will begin with the first track of the last selected disc. If the CD trays are empty, the TUNER will be selected instead.*
- *If the source selected is TAPE 1, and if the preset time is reached during high speed dubbing, the TUNER will be selected instead.*

To start the TIMER again *(for the same time)*
1 Press **CLOCK•TIMER** for more than 2 seconds.
2 Press **CLOCK•TIMER** again to store the start time and the selected source.

RECORDING



Notes:
- *If you do not intend to record via the microphone, unplug the microphone to avoid accidental mixing with other recording sources.*
- *For recording, use only tape of IEC type 1 (normal tape) or IEC type II (Chrome).*
- *The tape is secured at both ends with leader tape. At the beginning and end of tape, nothing will be recorded for six to seven seconds.*
- *The recording level is set automatically, regardless of the position of VOLUME, DBB or Incredible Surround.*
- *To prevent accidental recording, break out the tab on the left shoulder of the tape side that you want to protect.*
- *If "CHECK TAPE" is displayed, the protection tab has been broken. Put a piece of clear adhesive tape over the opening. Do not cover the CrO_2 tape detection hole when covering the tab opening.*

Recording from other sources *(only on tape deck 2)*

1 Press **TAPE** to select tape deck 2 .
2 Load a blank tape into tape deck 2 with the open side downward.
3 Press **SIDE** on remote control to select the recording side.
  → The ◀ or ▶ (back or front) flag will be displayed, depending on the side selected.
4 Press **REVERSE MODE** to select the playback mode (⇆ or ⟲).
5 Press **CD**, **TUNER** or **AUX**.
- Start playback of the selected source.
6 Press **RECORD** to start recording.
  → The REC flag starts flashing.
7 Press **STOP ■** to stop recording.

Notes:
- *Only ⇆ or ⟲ mode is available during recording.*
- *During recording, it is not possible to listen to another source.*

Dubbing tapes *(from tape deck 1 to tape deck 2)*

1 Press **TAPE** to select tape deck 2 .
2 Load the prerecorded tape into tape deck 1 and a blank tape into tape deck 2.
  → Make sure that the tape in tape deck 1 has its full spool to the left.
3 Press **SIDE** on remote control to select the recording side.
4 Press **DUBBING** ***once*** for normal speed dubbing or ***twice*** *(within 2 seconds)* for high speed dubbing.
  → "NORMAL" (normal speed) or "FAST" (high speed) will be displayed and then followed by "DUBBING".
  → The HSD flag appears on the display for high speed dubbing.
- Dubbing will start immediately.
  → The REC flag starts flashing.
5 Press **STOP ■** to stop dubbing.

Notes:
- *At the end of side A, flip the tapes to side B and repeat the procedure.*
- *Dubbing of tapes is only possible from tape deck 1 to tape deck 2.*
- *To ensure good dubbing, use tapes of the same length.*
- *During high speed dubbing in Tape mode, the sound is reduced to a low volume.*
- *You can switch to other source while dubbing.*

RECORDING

CD Synchro Start Recording

1 Load a blank tape into tape deck 2 and a disc into the disc tray.
2 Press **CD** to select CD mode.
→ You can program the tracks in the order you want them to be recorded (see Programming Tracks). If not, the tracks are recorded according to the selected disc.
3 Press **RECORD** to start recording.
→ The REC flag starts flashing.
- CD will start playback automatically.

4 Press **STOP ■** to stop recording.

Recording the mixed sound/One Touch Recording

- During microphone mixing, you can record the mixed sound on a tape in tape deck 2 except dubbing mode *(not available for version /30)*.
- For One Touch Recording, as soon as you press RECORD, the current source will be recorded on tape deck 2.

1 Load a blank tape in tape deck 2.
2 Press **RECORD** to start recording.
→ The REC flag starts flashing.
3 Press **STOP ■** to stop recording.

Note:
– *When you press RECORD at TAPE mode, "SELECT OTHER SOURCE" will be displayed. One Touch Recording is not possible at TAPE mode.*

MAINTENANCE

Maintenance

Cleaning the Cabinet
- Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasives.

Cleaning Discs
- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the center out.
- Do not use solvents such as benzine, thinner, commercially available cleaners, or antistatic spray intended for analog records.

Cleaning the CD lens
- After prolonged usage, dirt or dust may accumulate at the CD lens. To ensure good playback quality, clean the CD lens with Philips CD Lens Cleaner or any commercially available. Follow the instructions supplied with the Lens Cleaner.

Cleaning the Tape Heads and the Tape Paths
- To ensure good recording and playback quality, clean the heads, capstan(s) and pressure roller(s) after every 50 hours of tape operation.
- Use a cotton swab slightly moistened with cleaning fluid or alcohol.
- You can also clean the heads by playing a cleaning tape through once.

Demagnetizing the heads
- Use a demagnetizing tape available at your dealer.

TROUBLESHOOTING

Warning! Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty.
- If a fault occurs, check the points listed below before taking the system for repair.
- Should any problems persist after you have made these checks, consult your nearest dealer or service center.

CD Player Operation

"NO DISC" is displayed.
- The disc is inserted upside down.
→ *Place CD with printed side up.*
- Moisture condensation at the lens.
→ *Wait until lens has adjusted to normal room temperature.*
- There is no disc in the CD tray.
→ *Insert a CD.*
- The CD is dirty, badly scratched or warped.
→ *Clean or replace the CD.*
- The CD lens is dirty or dusty.
→ *See section under Maintenance.*

Radio Reception

Poor radio reception
- The signal strength is too weak.
→ *Adjust the antenna.*
- The TV or VCR is too close to the stereo system.
→ *Separate the stereo system from the TV or VCR.*
→ *Connect an external antenna for better reception.*

Cannot tune to station.
- Wrong tuning grid.
→ *Switch to the correct tuning grid.*

Tape Deck Operation

"RECORDING ACTIVE" is displayed.
- A recording is in progress.
→ *Stop the recording or wait until it is finished.*

"TAPE DUBBING ONLY" is displayed.
- Tape dubbing is only possible in tape mode.
→ *Switch source to tape mode.*

Recording or playback cannot be made or there is a decrease in audio level.
- Dirty tape heads, capstans or pressure rollers.
→ *See section on tape deck maintenance.*
- Magnetic build-up in the record/playback head.
→ *Use demagnetizing tape.*

General

System does not react when any button is pressed.
- Electrostatic discharge.
→ *Press STANDBY•ON to switch the system off. Remove the AC power plug from the wall outlet, then reconnect and switch on the system again.*

No or poor sound.
- Volume is not turned up.
→ *Adjust VOLUME.*
- The headphones are connected.
→ *Disconnect the headphones.*
- Speakers are not connected or are connected wrongly.
→ *Check that the speakers are connected correctly.*
→ *Make sure that the stripped speaker wire is clamped.*

Reversed left and right sound.
- Speakers are incorrectly connected.
→ *Check the speaker connections and location.*

Lack of bass sound or apparently imprecise physical location of musical instruments.
- Speakers are incorrectly connected.
→ *Check the speaker connection for proper phasing, red/black wires to red/black terminals.*

Remote control has no effect on the system.
- Wrong source is selected.
→ *Select the source (CD, TUNER, etc.) before pressing the function button (PLAY, PREV/NEXT, etc.).*
- The distance to the system is too large.
→ *Reduce the distance.*
- Batteries are inserted incorrectly.
→ *Insert the batteries with their polarities (+/- signs) as indicated.*
- Batteries are exhausted.
→ *Replace the batteries.*

Timer not working.
- Timer is not switched on.
→ *Press CLOCK•TIMER on the system to switch on the timer.*
- Dubbing/recording is in progress.
→ *Stop dubbing/recording.*

System display features automatically and buttons flashing continuously.
- Demonstration mode is switched on.
→ *Press and hold STOP ■ for 3 seconds to switch off the demonstration mode.*

ADDITIONAL FEATURES - OTHER VERSION

Receiving RDS radio station

RDS (Radio Data System) is a broadcasting service that allows FM stations to send additional information along with the regular FM radio signal. This additional information can contain:

- **STATION NAME:** The station name is displayed.
- **FREQUENCY:** The frequency of the station is displayed.
- **PROGRAM TYPE:** The following program types exist and can be received by your tuner: News, Affairs, Info, Sport, Educate, Drama, Culture, Science, Varied, Pop M, Rock M, M.O.R. (middle of the road music), Light M, Classics, Other M, No type.
- **RADIO TEXT (RT):** text messages appear in the display.

When you have tuned to a RDS station, the RDS logo (and the station name will appear on the display:

- The display normally shows the radio station name if available.
  By repeatedly pressing **RDS** button you can change the type of display information:
  → The display shows in turn:
  STATION NAME → FREQUENCY →
  PROGRAM TYPE → RADIO TEXT →
  STATION NAME ...

Note:

- *When you press the RDS button and the display shows "NO RDS", it indicates that either the tuned station is not transmitting RDS signal or it is a non RDS station.*

RDS Time

Some RDS station may be transmitting a real clock time at an interval of every minute.

Setting the time with RDS clock

1 Press **CLOCK•TIMER**.
   → "- - : - -" or current time appears on the display.
2 Press **CLOCK•TIMER** once more to enter clock setting mode.
   → "00:00" or current time starts flashing.
3 Press **RDS**.
   → The message "SEARCH RDS TIME" will be displayed.
   → If the station does not transmit RDS clock, "NO RDS TIME" will be displayed.
   → When the RDS clock is read, "RDS TIME" will be displayed. The current clock time is displayed for 2 seconds and will be stored automatically.

News *(only available in Radio Station with RDS)*

You can activate NEWS function in Standby or any source mode except Tuner mode. Once the News PTY (program type) is detected in a RDS station, it will switch to TUNER mode automatically.

To start NEWS function

1 Press **NEWS**.

- The NEWS flag and "NEWS ON" will be displayed.
- It will search for the first available RDS station in the presets and wait for the News PTY (program type) to be available. During News PTY search :
  → If **NEWS** activate from Standby or Demo mode, the display will show "WAITING FOR NEWS".
  → If **NEWS** is activated from CD, Tape or Aux mode, the current source activity will be remain uninterrupted.
  → If no RDS station is found after the search, the News function will be switched off. The display will show "NO RDS NEWS" and NEWS flag will disappear from the display.
- When News transmission is detected, the system will switch to Tuner mode.
  → The NEWS flag starts flashing.
- After News has ended, the last selected source mode will be resumed.
  → The NEWS flag will disappear from the display.

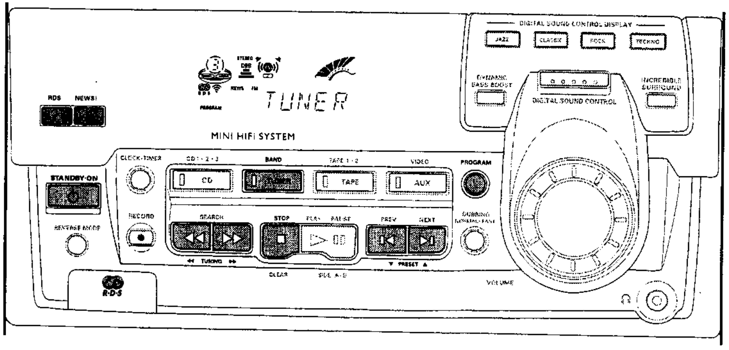
To cancel NEWS function

- Press **NEWS** again.
  → The NEWS flag disappears and "NEWS OFF" will be displayed.
  → The last selected source mode will be resumed.

Notes:

- *During NEWS bulletin, you can press any available source button to cancel NEWS function and execute the relevant source mode.*
- *The NEWS works only once for each activation.*
- *If NEWS is activated from Standby or Demostration mode, it switches to Tuner mode and the sound will be muted until News is available.*

ADDITIONAL FEATURES - OTHER VERSION



Easy Set *(only in Standby or Demonstration mode)*

EASY SET allows you to store all available radio stations and RDS stations in a particular band (FM•MW•LW) automatically.

1 Press and hold **STANDBY•ON** *(on the system only)* for 2 seconds.
   → "EASY SET" will be displayed and followed by "TUNER".
   → Easy set will start with the last active band.
   → All available radio stations with sufficient signal strength will be stored or until 40 presets are filled.
2 The system will search once again for the first available RDS station and to set the RDS time automatically.

- When searching RDS station;
  → "SEARCH RDS STATION" will be displayed. If no RDS station is available, the program will exit automatically.
  → After a station is found, "EASY SET" will be displayed and followed by "TIME".
- When searching RDS time;
  → "SEARCH RDS TIME" will be displayed.
  → When RDS time is read, "RDS TIME" will be displayed. The current time is displayed for 2 seconds and will be stored automatically.

Notes :

- *When EASY SET is used, all previously stored stations will be erased.*
- *The last preset station or the first available RDS will appear on the display when Easy Set is completed.*
- *If RDS station does not transmit RDS time within 90 seconds, the program will exit automatically and the display will show "NO RDS TIME".*

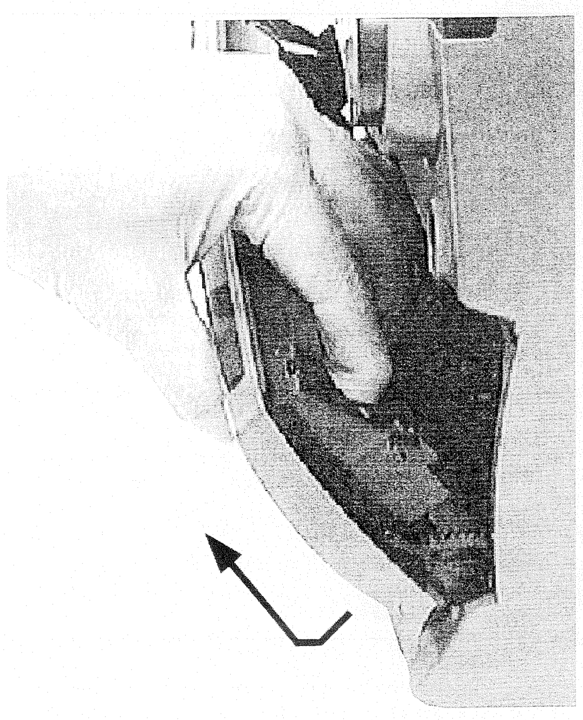
Tuning to Radio Stations

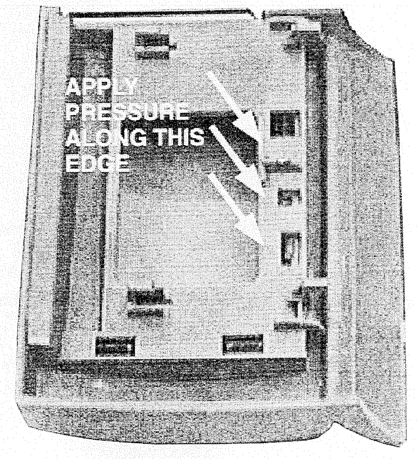
1 Press **TUNER** to select TUNER mode.
   → "TUNER" will be displayed.
   → The preset station number, frequency and waveband appear on the display.
2 Press **TUNER (BAND)** again to select the desired waveband : FM, MW or LW.
3 Press **TUNING ◀◀** or **▶▶** for more than one second, then release.
   → The display will show "SEARCH" until a radio station with sufficient signal strength is found.

- Repeat this procedure until the desired radio station is reached.
- To tune to a weak station, briefly press **TUNING ◀◀** or **▶▶** until the display shows the desired frequency and/or when the best reception has been obtained.

DISMANTLING INSTRUCTIONS

Dismantling of the Cassette Cover

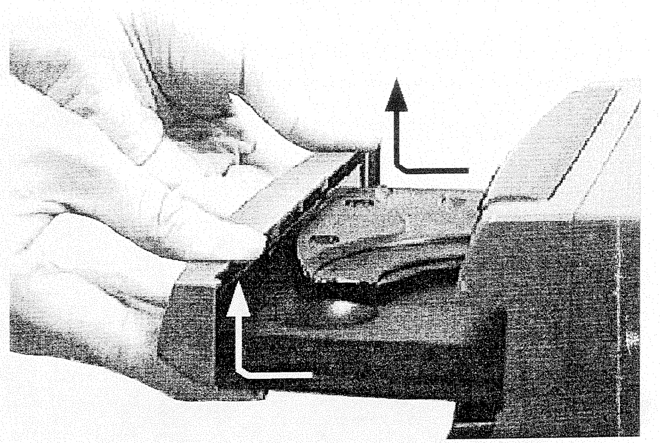




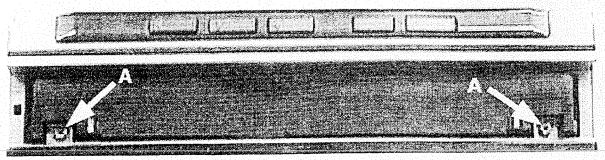
Cassette door

Dismantling of the CDC Module and Front Panel

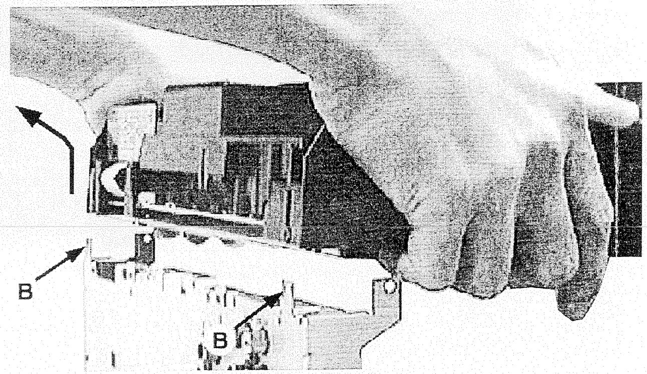
1) Loosen the 19 screws to remove the Cabinet Rear (pos 289).
   - 5 screws each on the left & right side of the Cabinet
   - 9 screws at the rear of the Cabinet
2) Slide out the tray and remove the Cover Tray CDC (pos 205) as indicated.
3) Loosen the 2 screws A and 2 screws B to remove the CDC Module (pos 1104) as indicated.
4) Remove 1 screw at the bottom to separate the Front Panel Assembly from the Bottom Plate (pos 286).



Remove Cover Tray CDC



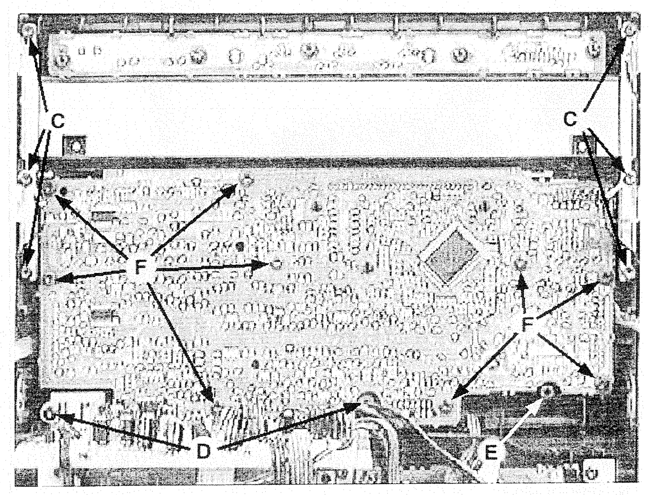
Front CDC



Remove CDC Module

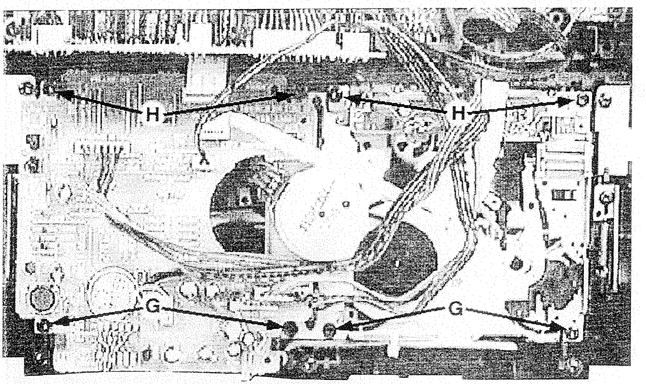
Dismantling of the Front Board

1) Remove 6 screws C as indicated to take out the CDC Left Bracket (pos 267) and CDC Right Bracket (pos 268).
2) Remove 2 screws D as indicated to loosen the AF Board (pos 1101).
3) Remove 1 screw E as indicated to loosen the Karaoke Board (only for set with Karaoke board).
4) Remove 9 screws F as indicated to loosen the Front Board (pos 1102).



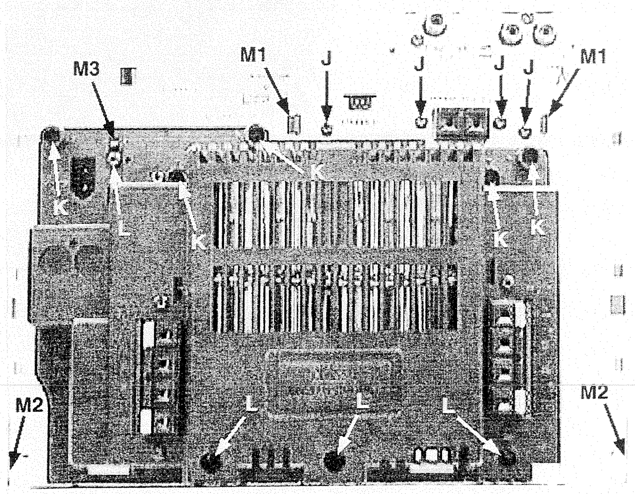
Dismantling of the ETF Module

1) Remove 8 screws (4 x screws G and 4 x screws H) as indicated to loosen the ETF Module (pos 1105).

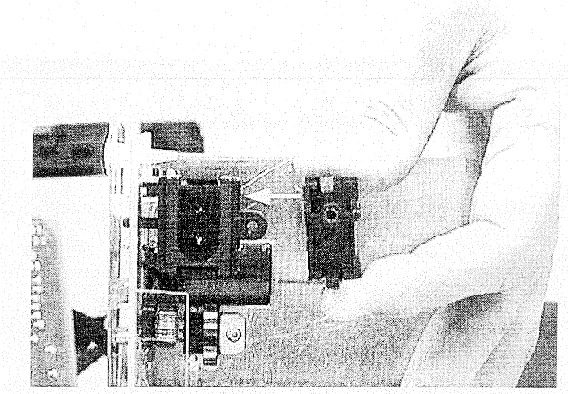


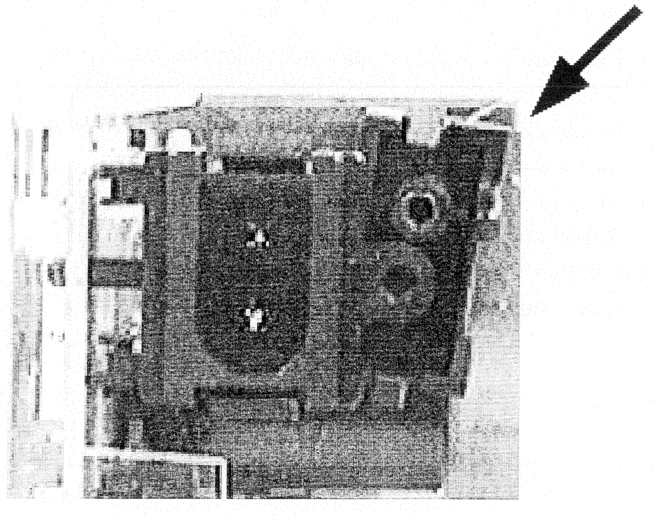
Dismantling of Rear Portion

1) Remove 4 screws J and uncatch M1 to loosen the Tuner Board (pos 1100).
2) Remove 5 screws K and uncatch M2 to take out the Rear Plate (pos 284).
3) Remove 4 screws L and uncatch M3 to free the rucksack (Power Module).



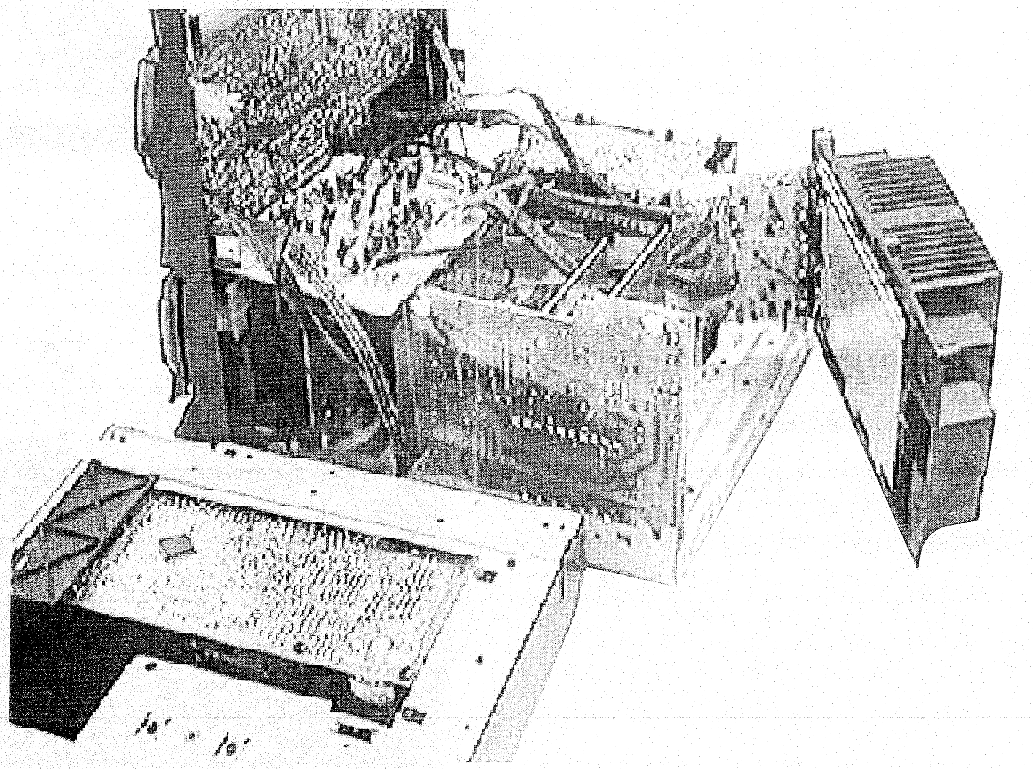
Hints for Power Module & Rear Panel assembly



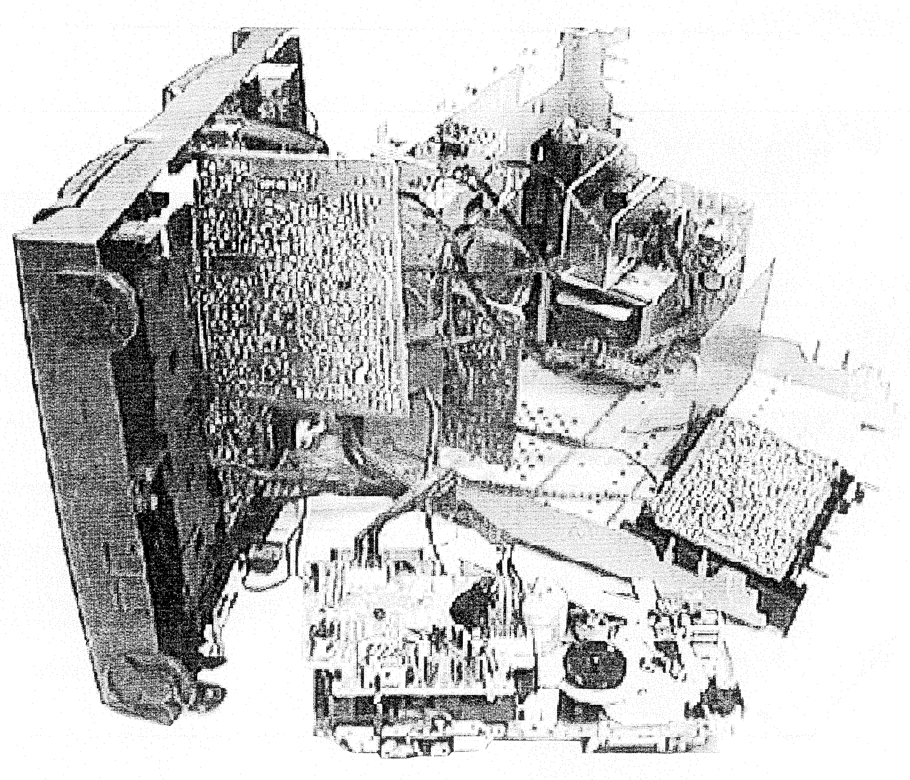


1) During re-assembly of the Rucksack (Power module), care should be taken to alignment all Loudspeaker sockets into the openings. Do not force bend the leads of the sockets.
2) Place the bracket, as indicated, behind the mains socket and catch it into the Rucksack.
3) Assemble the Rear Plate onto the Bottom plate, care should be taken not to damage any wires or pc board copper pattern.

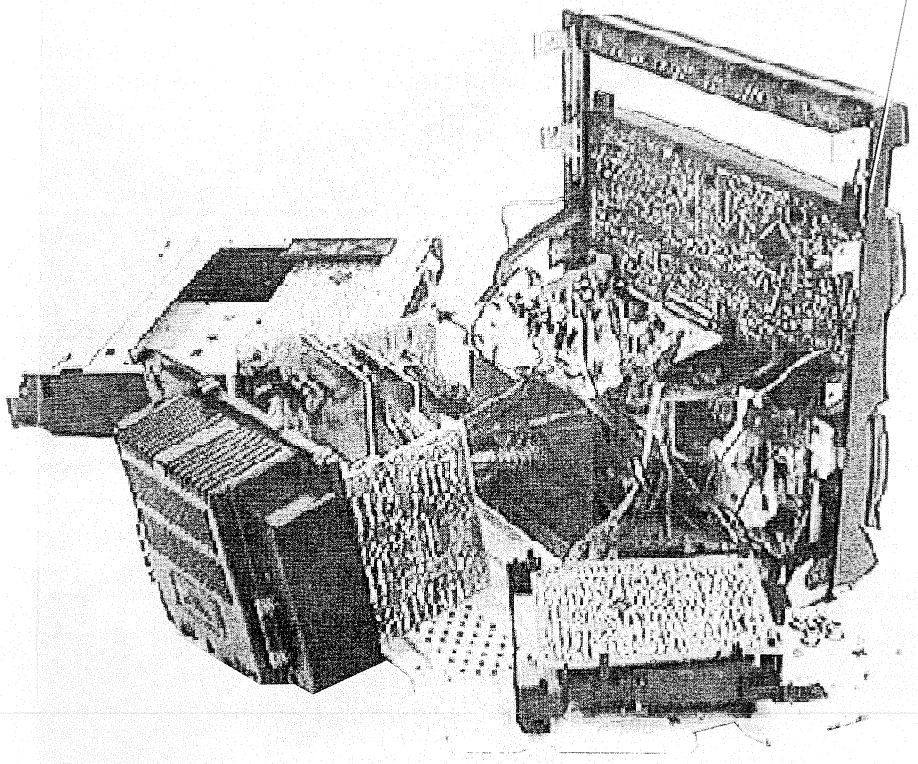
Service pos A



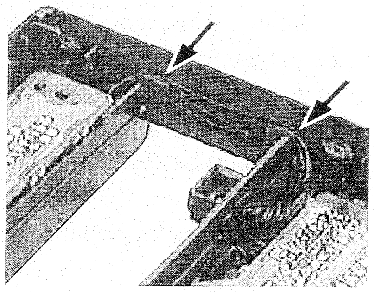
Service pos B



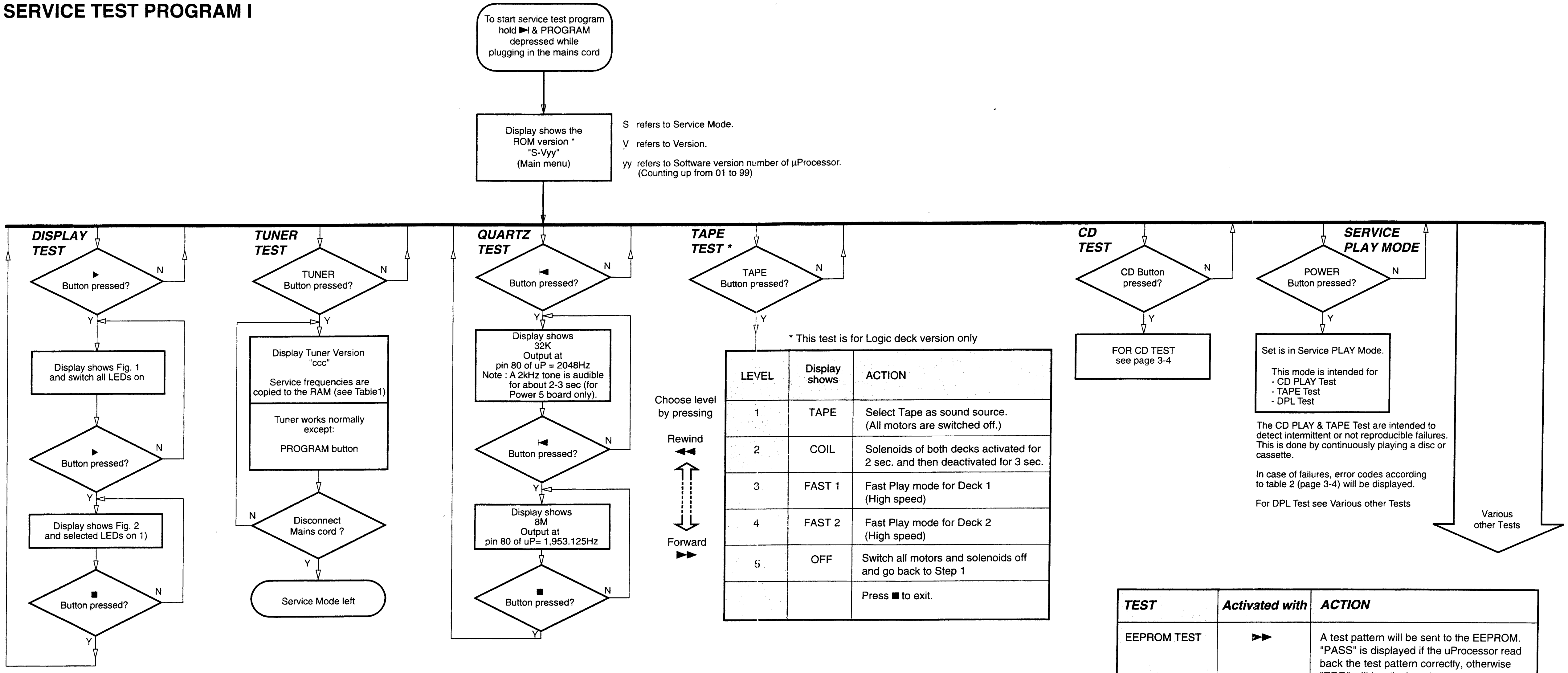
Service pos C



Note: During re-assembly Front board, care should be taken to dress the thin bunch of wires properly in the slots provided so that it will not be damaged by the CDC bracket (pos 267).



SERVICE TEST PROGRAM I


To start service test program hold ▶I & PROGRAM depressed while plugging in the mains cord
Display shows the ROM version * "S-Vyy" (Main menu)
DISPLAY TEST
▶ Button pressed?
Y
N
Display shows Fig. 1 and switch all LEDs on
▶ Button pressed?
Display shows Fig. 2 and selected LEDs on 1)
■ Button pressed?
TUNER TEST
TUNER Button pressed?
Display Tuner Version "ccc"
Service frequencies are copied to the RAM (see Table1)
Tuner works normally except:
PROGRAM button
Disconnect Mains cord ?
Service Mode left
QUARTZ TEST
I◀ Button pressed?
Display shows 32K Output at pin 80 of uP = 2048Hz Note : A 2kHz tone is audible for about 2-3 sec (for Power 5 board only).
I◀ Button pressed?
Display shows 8M Output at pin 80 of uP= 1,953.125Hz
■ Button pressed?
TAPE TEST *
TAPE Button pressed?
Choose level by pressing
Rewind ◀◀
Forward ▶▶
CD TEST
CD Button pressed?
FOR CD TEST see page 3-4
SERVICE PLAY MODE
POWER Button pressed?
Set is in Service PLAY Mode.
This mode is intended for
- CD PLAY Test
- TAPE Test
- DPL Test
Various other Tests

S refers to Service Mode.

V refers to Version.

yy refers to Software version number of µProcessor. (Counting up from 01 to 99)

* This test is for Logic deck version only

LEVEL	Display shows	ACTION
1	TAPE	Select Tape as sound source. (All motors are switched off.)
2	COIL	Solenoids of both decks activated for 2 sec. and then deactivated for 3 sec.
3	FAST 1	Fast Play mode for Deck 1 (High speed)
4	FAST 2	Fast Play mode for Deck 2 (High speed)
5	OFF	Switch all motors and solenoids off and go back to Step 1
		Press ■ to exit.

The CD PLAY & TAPE Test are intended to detect intermittent or not reproducible failures. This is done by continuously playing a disc or cassette.

In case of failures, error codes according to table 2 (page 3-4) will be displayed.

For DPL Test see Various other Tests

PRESET	Europe "EUR"	East Eur. 3-band "EAS"	East Eur. 2-band "EAS"	USA "USA"	Oversea "OSE"	Korea "KOR"	Japan "JAP"
1	87.5MHz	65.81MHz	65.81MHz	87.5MHz	87.5MHz	87.5MHz	76MHz
2	108MHz	108MHz	108MHz	108MHz	108MHz	108MHz	CH3 107.75MHz
3	531kHz	74MHz	74MHz	530kHz	531/530kHz	531kHz	90MHz
4	1602kHz	87.5MHz	87.5MHz	1700kHz	1602/1700kHz	1602kHz	CH1 95.75MHz
5	558kHz	531kHz	531kHz	560kHz	558/560kHz	558kHz	CH2 101.75MHz
6	1494kHz	1602kHz	1602kHz	1500kHz	1494/1500kHz	1494kHz	531kHz
7	153kHz	558kHz	558kHz	98MHz	87.5MHz	87.5MHz	1602kHz
8	279kHz	1494kHz	1494kHz	87.5MHz	87.5MHz	87.5MHz	558kHz
9	198kHz	153kHz	98MHz	87.5MHz	87.5MHz	87.5MHz	1494kHz
10	98MHz	279kHz	70.01MHz	87.5MHz	87.5MHz	87.5MHz	80MHz
11	87.5MHz	198kHz	65.81MHz	87.5MHz	98MHz	98MHz	76MHz

Table 1

East Europe TUNER IF offset correction

1) Input a reference frequency 87.5MHz from the generator.
2) Proceed to the Tuner Test Mode
3) Hold TUNER button down for > 3 seconds
4) The set will self-calibrate automatically and display "OFS-xx" when calibration is successful, otherwise it will display "00E".

xx : offset value between -3 to +3

Note: This has to be done whenever the Eeprom, Microprocessor or the components in the oscillator circuitry are replaced.

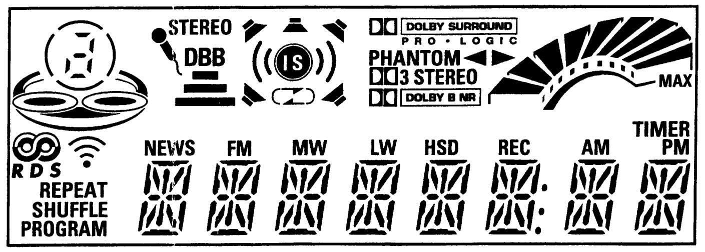
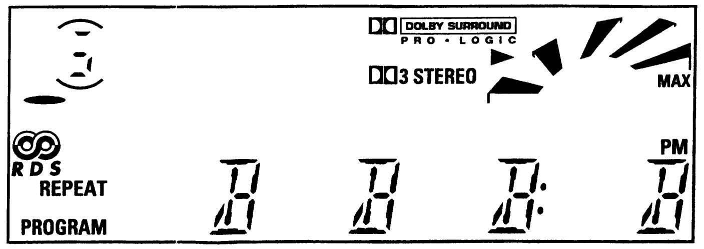

STEREO
DBB
IS
DOLBY SURROUND
PRO · LOGIC
PHANTOM
3 STEREO
DOLBY B NR
MAX
TIMER
PM
NEWS
FM
MW
LW
HSD
REC
AM
RDS
REPEAT
SHUFFLE
PROGRAM

Figure 1


DOLBY SURROUND
PRO · LOGIC
3 STEREO
MAX
PM
RDS
REPEAT
PROGRAM

1) CDC1, CDC3, Tuner, Aux, Incredible Surround, Jazz, Rock, Center Phantom, ◀◀, ▶, I◀.

Figure 2

TEST	*Activated with*	*ACTION*
EEPROM TEST	▶▶ ■ to Exit	A test pattern will be sent to the EEPROM. "PASS" is displayed if the uProcessor read back the test pattern correctly, otherwise "ERR" will be displayed.
EEPROM FORMAT	◀◀	Load default data. Display shows "NEW" for 1 second. ***Caution!*** ***All presets from the customer will be lost!!***
KEY TEST	▶I ■ to Exit	Key numbers according table 3 are shown on the display. (see Chapter 3-4)
FAST CLOCK TEST	CLOCK/TIMER	The clock is switched to fast mode. "FAST" is displayed for 1 sec. Press CLOCK/TIMER again to reset the clock to normal. "NORMAL" displayed for 1 sec.
VOLUME TEST	Volume Knob	Display shows volume value for 2 seconds. Volume increases or decreases in steps of 1 until 0 (Min.) or 40 (Max.) is reached.
DPL TEST (only possible in Service Play mode)	DPL	The set enters into Pro-logic install mode. The noise-source switches between Left, Center, Right and Rear speakers. Pro-logic settings cannot be install in this test.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

Error code	Type	Error Description
E1000	W	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1001	W	Radial Error Triggered when the radial servo is off-track for a certain time during play.
E1002	W	Sledge In Error The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed. Inner-switch or sledge motor problem.
E1003	W	Sledge Out Error The sledge did not come out of its inner position (inner-switch is still open) before approximately 250 mSec. have passed by. Inner-switch or sledge motor problem.
E1005	W	Jump-offtrack error Triggered in normal play when the jump destination could not be found within a certain time.
E1006	W	Subcode Error (no subcode within time) Triggered when a new subcode was missing for a certain time during play.
E1007	W	PLL Error The Phase Lock Loop could not lock within a certain time.
E1008	W	Turntable Motor Error Generated when the CD could not reached 75% of speed during startup within a certain time. Discmotor problem.
E1020	F	Focus Search Error The focus point has not been found within a certain time.
E1070	W	The carousel switch is not open within time. This can happen when either the switch is defective and closed all the time, or when the carousel is blocked when located exactly at a disc position.
E1071	W	The carousel position switch did not close within a certain time. This can happen when the switch is defective and never closes electrically, or when the carousel is blocked in between two disc positions. The time-out is approximately 5 Sec.
E1079	W	The drawer could not enter the inside position is opening again. This can be caused because the drawer is blocked by something and cannot go fully inside, or the drawer switch is defective and does not close.
E2020	F	Head Movement Error Deck 1 Generated if the head does not reach the desired position within a certain time.
E2021	F	Head Movement Error Deck 2 Generated if the head does not reach the desired position within a certain time.

F = Fatal error & the set stop play function W = Warning

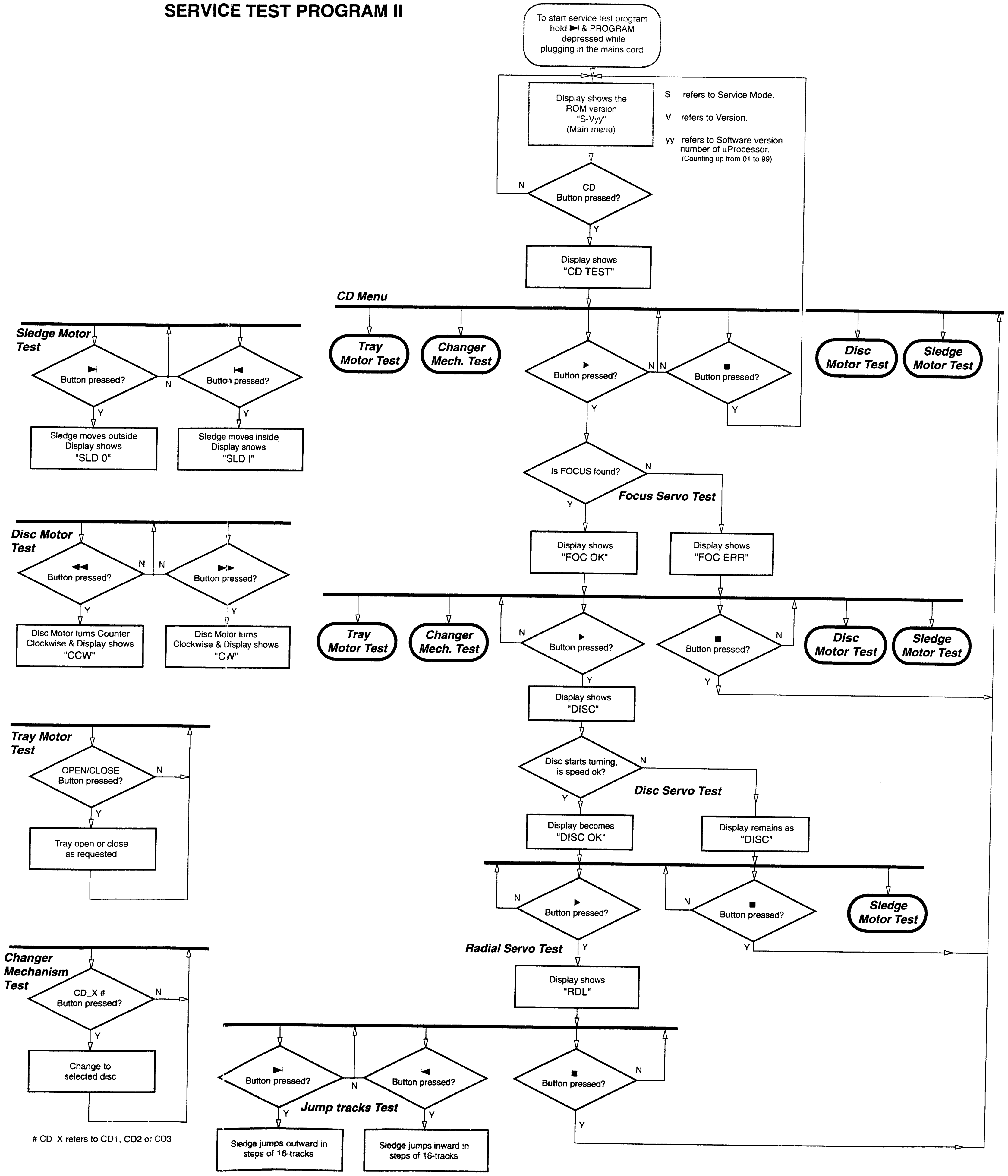
Table 2

Keys activated	Display shows	Keys activated	Display shows	Keys activated	Display shows
No Key pressed	--	PROLOGIC*	10	MODE*	21
Any Remote control key	RC	PHANTOM*	11	RECORD*	22
CD1*	1	3 STEREO*	12	◀◀	23
CD2*	2	INCREDIBLE SURROUND*	13	▶▶	24
CD3*	3	STANDBY-ON	14	■	Exit
DISC CHANGE	4	CLOCK / TIMER	15	▶II	26
OPEN / CLOSE	5	CD	16	I◀	27
RDS*	6	TUNER	17	▶I	28
NEWS*	7	TAPE	18	HSD	29
DSC	8	AUX	19		
DBB	9	PROGRAM	20		

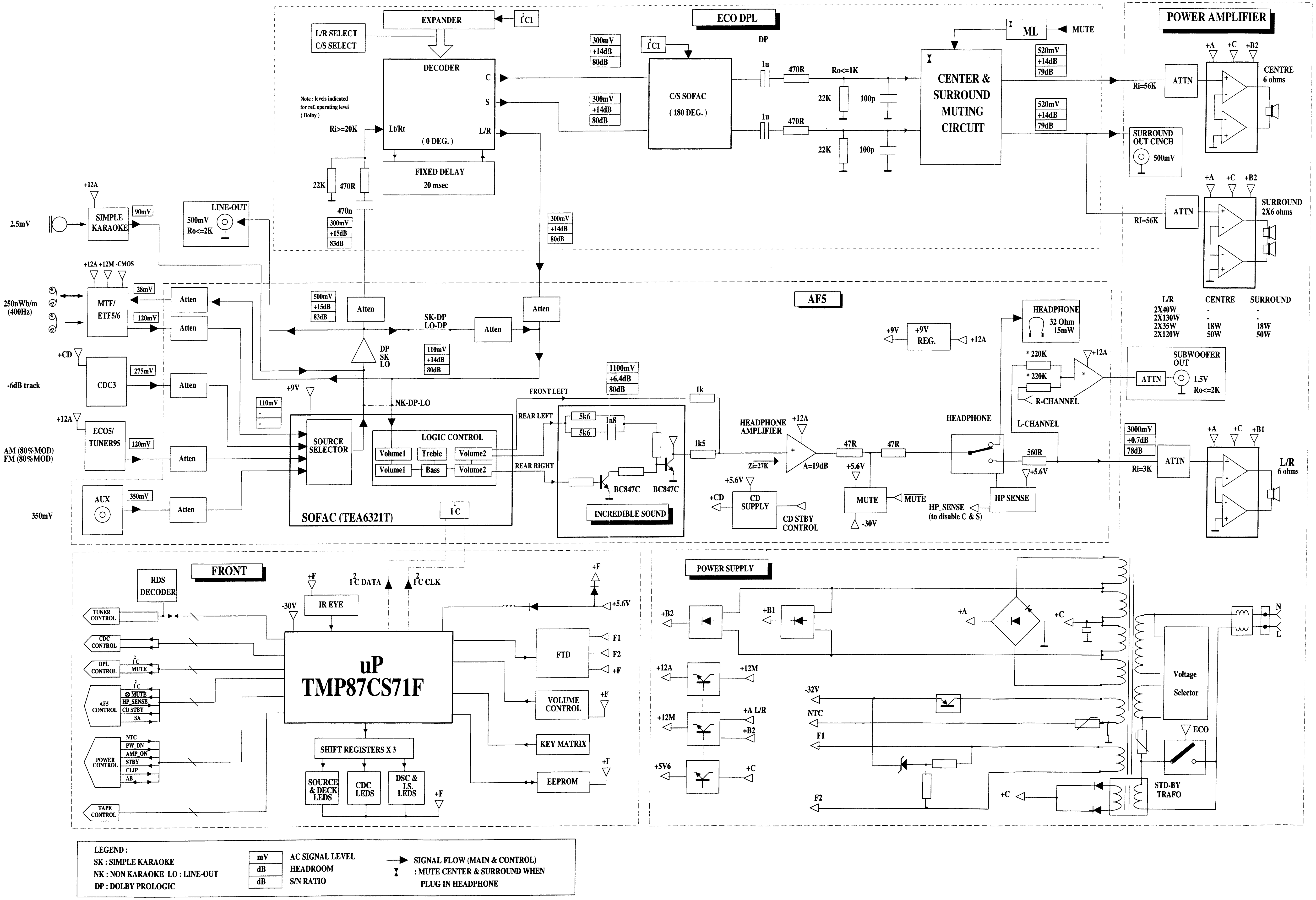
* Not for all type/version

Table 3

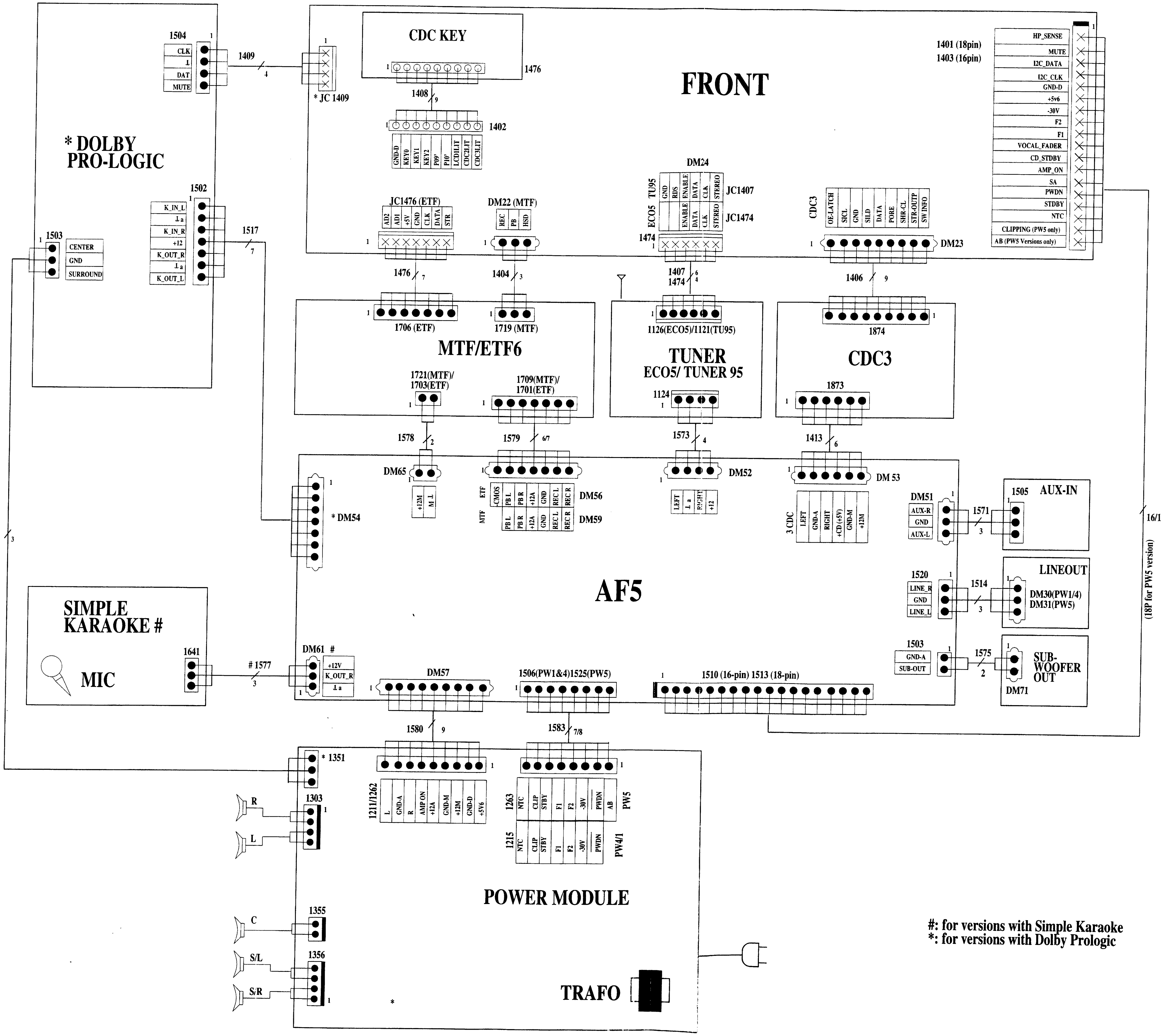
SERVICE TEST PROGRAM II


To start service test program hold ▶I & PROGRAM depressed while plugging in the mains cord
Display shows the ROM version "S-Vyy" (Main menu)
S refers to Service Mode.
V refers to Version.
yy refers to Software version number of µProcessor. (Counting up from 01 to 99)
CD Button pressed?
N
Y
Display shows "CD TEST"
CD Menu
Tray Motor Test
Changer Mech. Test
▶ Button pressed?
■ Button pressed?
Disc Motor Test
Sledge Motor Test
Is FOCUS found?
Focus Servo Test
Display shows "FOC OK"
Display shows "FOC ERR"
Display shows "DISC"
Disc starts turning, is speed ok?
Disc Servo Test
Display becomes "DISC OK"
Display remains as "DISC"
Radial Servo Test
Display shows "RDL"
▶I Button pressed?
I◀ Button pressed?
Jump tracks Test
Sledge jumps outward in steps of 16-tracks
Sledge jumps inward in steps of 16-tracks
Sledge Motor Test
Sledge moves outside Display shows "SLD 0"
Sledge moves inside Display shows "SLD I"
Disc Motor Test
◀◀ Button pressed?
▶▶ Button pressed?
Disc Motor turns Counter Clockwise & Display shows "CCW"
Disc Motor turns Clockwise & Display shows "CW"
Tray Motor Test
OPEN/CLOSE Button pressed?
Tray open or close as requested
Changer Mechanism Test
CD_X # Button pressed?
Change to selected disc
# CD_X refers to CD1, CD2 or CD3

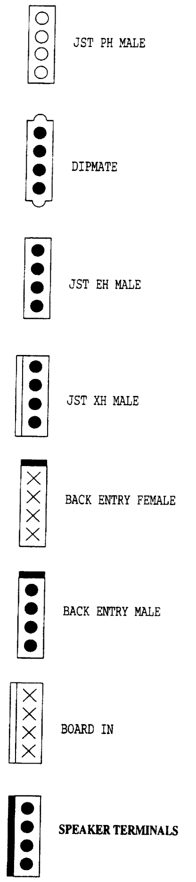
SET BLOCK DIAGRAM


EXPANDER
I²C1
L/R SELECT
C/S SELECT
ECO DPL
DP
ML
MUTE
POWER AMPLIFIER
DECODER
C
S
Lt/Rt
L/R
(0 DEG.)
Ri>=20K
Note : levels indicated for ref. operating level (Dolby)
FIXED DELAY
20 msec
22K
470R
470n
300mV
+15dB
83dB
300mV
+14dB
80dB
C/S SOFAC
(180 DEG.)
1u
470R
Ro<=1K
22K
100p
CENTER & SURROUND MUTING CIRCUIT
520mV
+14dB
79dB
Ri=56K
ATTN
+A
+C
+B2
CENTRE
6 ohms
SURROUND OUT CINCH
500mV
SURROUND
2X6 ohms
RI=56K
2.5mV
+12A
SIMPLE KARAOKE
90mV
LINE-OUT
500mV
Ro<=2K
+12A +12M -CMOS
250nWb/m
(400Hz)
MTF/ ETF5/6
28mV
120mV
Atten
500mV
+15dB
83dB
DP
SK
LO
SK-DP
LO-DP
110mV
+14dB
80dB
AF5
+9V
+9V REG.
+12A
HEADPHONE
32 Ohm
15mW
L/R
CENTRE
SURROUND
2X40W
2X130W
2X35W
2X120W
18W
50W
18W
50W
+CD
CDC3
275mV
-6dB track
+12A
ECO5/ TUNER95
120mV
AM (80%MOD)
FM (80%MOD)
AUX
350mV
350mV
110mV
NK-DP-LO
SOURCE SELECTOR
LOGIC CONTROL
Volume1
Treble
Volume2
Volume1
Bass
Volume2
SOFAC (TEA6321T)
I²C
FRONT LEFT
REAR LEFT
REAR RIGHT
1100mV
+6.4dB
80dB
5k6
1n8
BC847C
BC847C
INCREDIBLE SOUND
1k
1k5
HEADPHONE AMPLIFIER
+12A
Zi=27K
A=19dB
47R
47R
+5.6V
MUTE
MUTE
-30V
+5.6V
+CD
CD SUPPLY
CD STBY CONTROL
* 220K
* 220K
R-CHANNEL
L-CHANNEL
+12A
SUBWOOFER OUT
ATTN
1.5V
Ro<=2K
HEADPHONE
HP_SENSE
(to disable C & S)
HP SENSE
3000mV
+0.7dB
78dB
560R
+5.6V
ATTN
Ri=3K
+A
+C
+B1
L/R
6 ohms
FRONT
RDS DECODER
+F
I²C DATA
I²C CLK
IR EYE
-30V
+F
+5.6V
TUNER CONTROL
CDC CONTROL
DPL CONTROL
I²C
MUTE
AF5 CONTROL
I²C
MUTE
HP_SENSE
CD STBY
SA
POWER CONTROL
NTC
PW_DN
AMP_ON
STBY
CLIP
AB
TAPE CONTROL
uP
TMP87CS71F
FTD
F1
F2
+F
VOLUME CONTROL
+F
KEY MATRIX
EEPROM
+F
SHIFT REGISTERS X 3
SOURCE & DECK LEDS
CDC LEDS
DSC & I.S. LEDS
+F
POWER SUPPLY
+B2
+B1
+A
+C
N
L
+12A
+12M
+12M
+A L/R
+B2
+5V6
+C
-32V
NTC
F1
F2
Voltage Selector
ECO
STD-BY TRAFO
+C
LEGEND :
SK : SIMPLE KARAOKE
NK : NON KARAOKE LO : LINE-OUT
DP : DOLBY PROLOGIC
mV AC SIGNAL LEVEL
dB HEADROOM
dB S/N RATIO
SIGNAL FLOW (MAIN & CONTROL)
: MUTE CENTER & SURROUND WHEN PLUG IN HEADPHONE

SET WIRING DIAGRAM


* DOLBY PRO-LOGIC
1504
CLK
⊥
DAT
MUTE
1409
4
* JC 1409
1502
K_IN_L
⊥a
K_IN_R
+12
K_OUT_R
⊥a
K_OUT_L
1503
CENTER
GND
SURROUND
1517
7
CDC KEY
1476
1408
9
1402
GND-D
KEY0
KEY1
KEY2
P00
P10
LCDILIT
CDC2LIT
CDC3LIT
FRONT
1401 (18pin)
1403 (16pin)
HP_SENSE
MUTE
I2C_DATA
I2C_CLK
GND-D
+5v6
-30V
F2
F1
VOCAL_FADER
CD_STDBY
AMP_ON
SA
PWDN
STDBY
NTC
CLIPPING (PW5 only)
AB (PW5 Versions only)
JC1476 (ETF)
AD2
AD1
+5V
GND
CLK
DATA
STR
DM22 (MTF)
REC
PB
HSD
DM24
TU95
ECO5
GND
RDS
ENABLE
DATA
CLK
STEREO
JC1407
JC1474
1474
CDC3
OE-LATCH
SICL
GND
SILD
DATA
PORE
SHR-CL
STR-OUTP
SW INFO
DM23
1476
7
1404
3
1407
1474
6
4
1406
9
1706 (ETF)
1719 (MTF)
MTF/ETF6
1721(MTF)/
1703(ETF)
1709(MTF)/
1701(ETF)
1126(ECO5)/1121(TU95)
TUNER
ECO5/ TUNER 95
1124
1874
CDC3
1873
1578
2
1579
6/7
1573
4
1413
6
DM65
+12M
M ⊥
ETF
MTF
-CMOS
PB L
PB R
+12A
GND
REC L
REC R
DM56
DM59
DM52
LEFT
⊥a
RIGHT
+12
DM 53
3 CDC
LEFT
GND-A
RIGHT
+CD (+5V)
GND-M
+12M
* DM54
1576 *
3
AF5
DM51
AUX-R
GND
AUX-L
1571
3
1505
AUX-IN
1520
LINE_R
GND
LINE_L
1514
3
LINEOUT
DM30(PW1/4)
DM31(PW5)
1503
GND-A
SUB-OUT
1575
2
SUB-WOOFER OUT
DM71
16/18
(18P for PW5 version)
SIMPLE KARAOKE #
1641
MIC
# 1577
3
DM61 #
+12V
K_OUT_R
⊥a
DM57
1506(PW1&4)1525(PW5)
1510 (16-pin) 1513 (18-pin)
1580
9
1583
7/8
* 1351
R
L
1303
1211/1262
L
GND-A
R
AMP ON
+12A
GND-M
+12M
GND-D
+5V6
1263
NTC
CLIP
STBY
F1
F2
-30V
PWDN
AB
PW5
1215
NTC
CLIP
STBY
F1
F2
-30V
PWDN
PW4/1
POWER MODULE
C
1355
S/L
S/R
1356
TRAFO

#: for versions with Simple Karaoke
*: for versions with Dolby Prologic


JST PH MALE
DIPMATE
JST EH MALE
JST XH MALE
BACK ENTRY FEMALE
BACK ENTRY MALE
BOARD IN
SPEAKER TERMINALS

FRONT BOARD

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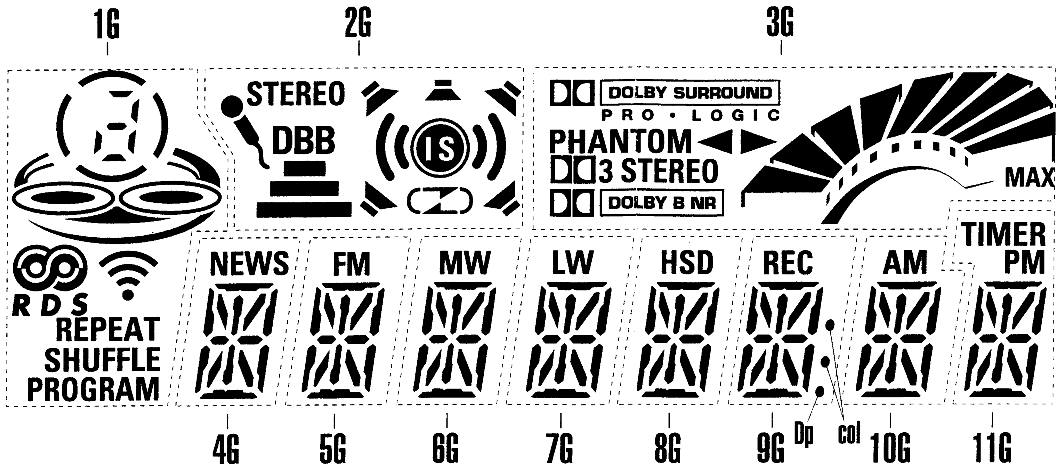
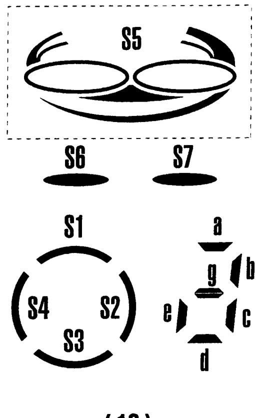
Front Display part - Component & Chip layout 6-2
Front Display part - Circuit diagram 6-3
Key-CDC part - Layouts & Circuit diagram 6-4
Electrical parts list... 6-5

LCD DISPLAY PIN CONNECTIONS

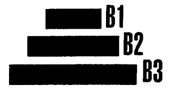


1G
2G
3G
STEREO
DBB
IS
DOLBY SURROUND
PRO • LOGIC
PHANTOM
3 STEREO
DOLBY B NR
MAX
TIMER
PM
RDS
REPEAT
SHUFFLE
PROGRAM
NEWS
FM
MW
LW
HSD
REC
AM
4G
5G
6G
7G
8G
9G
Dp
col
10G
11G

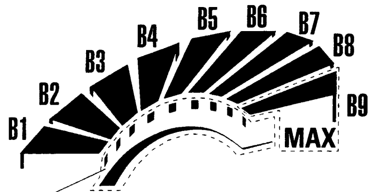


S5
S6
S7
S1
S4
S2
S3
a
g
b
e
c
d

(1G)

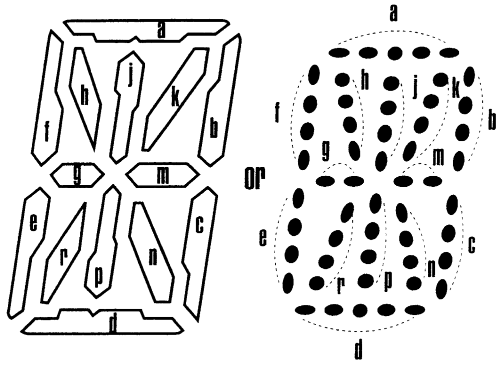


(2G)



B1
B2
B3
B4
B5
B6
B7
B8
B9
MAX
S8

(3G)



a
h
j
k
f
b
g
m
or
e
r
p
n
c
d

(4G~11G)

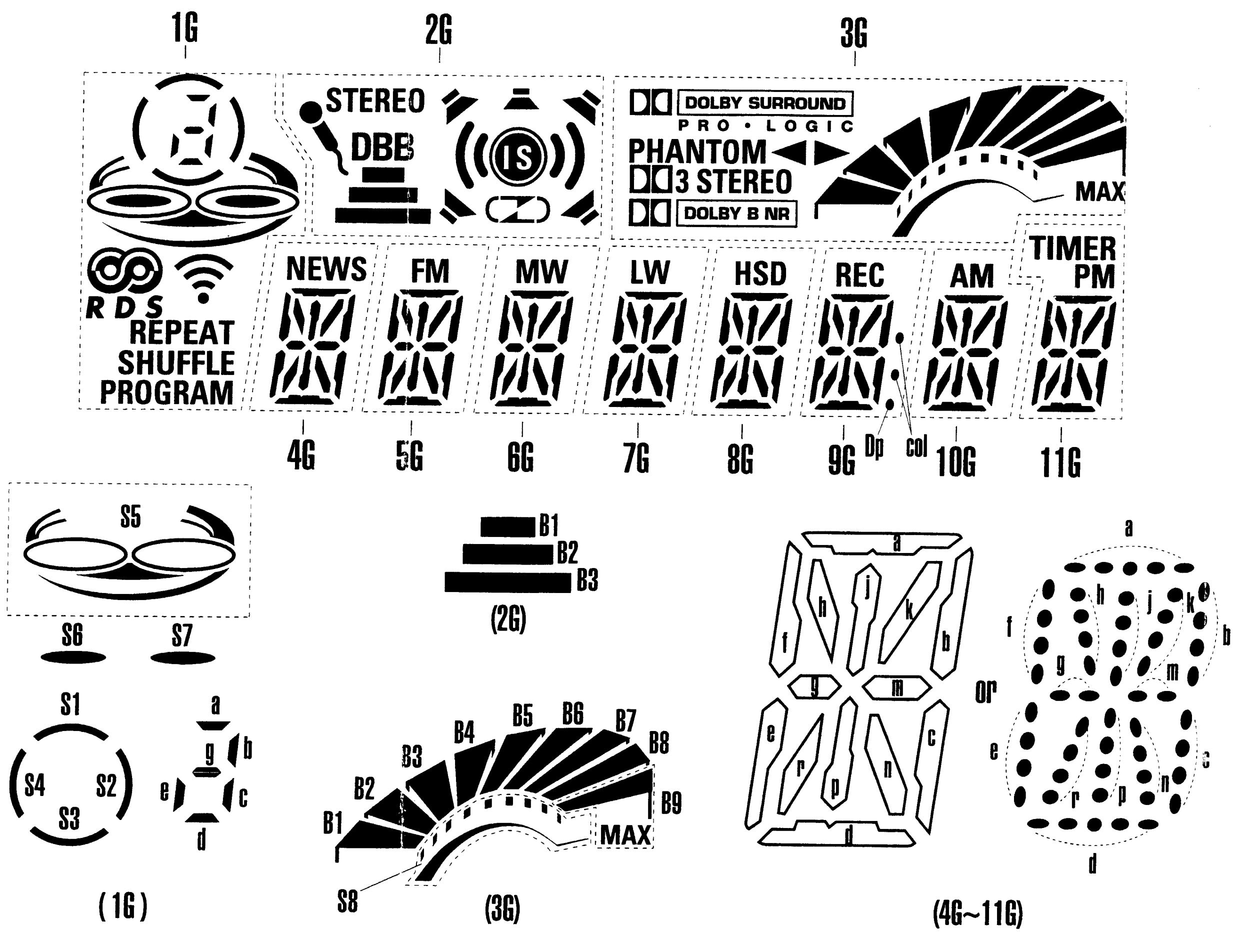
	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G
P1	S1	**STEREO**	DD DOLBY SURROUND PRO • LOGIC	a	a	a	a	a	a	a	a
P2	S2	**DBB**	**PHANTOM**	h	h	h	h	h	h	h	h
P3	S3	B1	**DD3 STEREO**	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p
P4	S4	B2	DD DOLBY B NR	k	k	k	k	k	k	k	k
P5	a , g , d	B3	B1	b	b	b	b	b	b	b	b
P6	b	◥	B2	f	f	f	f	f	f	f	f
P7	c	◤	B3	m	m	m	m	m	m	m	m
P8	e	▲	B4	g	g	g	g	g	g	g	g
P9	**REPEAT**	IS	B5	c	c	c	c	c	c	c	c
P10	**SHUFFLE**	(( ))	B6	e	e	e	e	e	e	e	e
P11	**PROGRAM**	◣ ◢	B7	r	r	r	r	r	r	r	r
P12	S5	⧗	B8	n	n	n	n	n	n	n	n
P13	S6	)	B9	d	d	d	d	d	d	d	d
P14	S7	(	S8	**NEWS**	**FM**	**MW**	**LW**	**HSD**	**REC**	**AM**	**TIMER**
P15	RDS	🎤	▶	-	-	-	-	-	col	-	**PM**
P16	📶	○	◀	-	-	-	-	-	Dp	-	-

Variations

22
1401
1403
1407
1409
1455/145
1457
1458
1462/146
1474
1476
2411/241
2415
2420
2421/242
2423
2424
2425
2438
3521/352
3525
3533
3534
3535
3536
3537/353
3539
3544
3545/354
3561/356
3591
3603
3604
3605
4415
4421
4610
4611
4612
4613
4614
4615
5415
5417
6003
6007
6010
6012
6031
6034/6037
6040
6054
7405
7415

x = Item in

LCD DISPLAY PIN CONNECTIONS


1G
2G
3G
STEREO
DBB
DOLBY SURROUND
PRO • LOGIC
PHANTOM
3 STEREO
DOLBY B NR
MAX
TIMER
PM
NEWS
FM
MW
LW
HSD
REC
AM
RDS
REPEAT
SHUFFLE
PROGRAM
4G
5G
6G
7G
8G
9G
Dp
col
10G
11G
S5
S6
S7
B1
B2
B3
(2G)
S1
S2
S3
S4
a
b
c
d
e
g
B4
B5
B6
B7
B8
B9
S8
(1G)
(3G)
a
b
c
d
e
f
g
h
j
k
m
n
p
r
or
(4G~11G)

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G
P1	S1	**STEREO**	DD DOLBY SURROUND PRO • LOGIC	a	a	a	a	a	a	a	a
P2	S2	**DBB**	**PHANTOM**	h	h	h	h	h	h	h	h
P3	S3	B1	**DD3 STEREO**	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p
P4	S4	B2	DD DOLBY B NR	k	k	k	k	k	k	k	k
P5	a , g , d	B3	B1	b	b	b	b	b	b	b	b
P6	b	◣	B2	f	f	f	f	f	f	f	f
P7	c	◤	B3	m	m	m	m	m	m	m	m
P8	e	▲	B4	g	g	g	g	g	g	g	g
P9	**REPEAT**	IS	B5	c	c	c	c	c	c	c	c
P10	**SHUFFLE**	(( ))	B6	e	e	e	e	e	e	e	e
P11	**PROGRAM**	◣ ◢	B7	r	r	r	r	r	r	r	r
P12	S5	Z	B8	n	n	n	n	n	n	n	n
P13	S6	)	B9	d	d	d	d	d	d	d	d
P14	S7	(	S8	**NEWS**	**FM**	**MW**	**LW**	**HSD**	**REC**	**AM**	**TIMER**
P15	RDS	🎤	▶	-	-	-	-	-	col	-	**PM**
P16	📶	○	◀	-	-	-	-	-	Dp	-	-

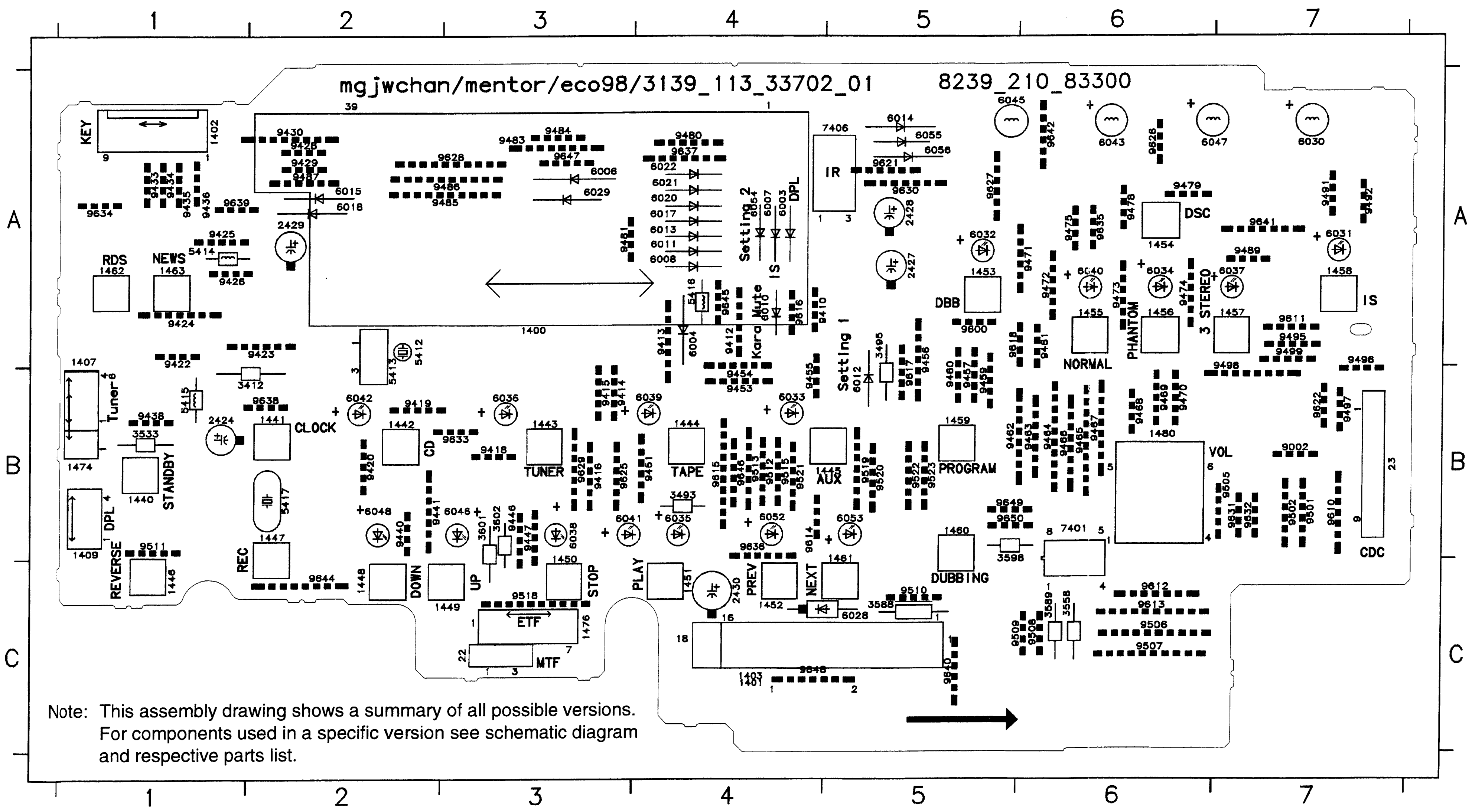
Variations table for Front board

	FW520C /37 FW510C /37	FW530C /30/37	FW530C /22 FW535C /34	FW530C /21/21M FW535C /21/21M	FW550C /22	FW560C /37	FW570C			FW575C /21/21M /33
							/21/21M	/22	/37	
22	x	-	-	-	-	x	-	-	-	-
1401	-	-	-	-	-	-	-	-	-	-
1403	x	x	x	x	x	x	x	x	x	x
1407	-	-	x	-	x	-	-	x	-	-
1409	-	-	-	-	-	-	-	-	-	-
1455/1456	-	-	-	-	-	-	-	-	-	-
1457	-	-	-	-	-	-	-	-	-	-
1458	-	x	x	x	x	-	x	x	x	x
1462/1463	-	-	x	-	x	-	-	x	-	-
1474	x	x	-	x	-	x	x	-	x	x
1476	-	x	x	x	x	-	x	x	x	x
2411/2412	-	-	-	-	-	-	-	-	-	-
2415	-	-	100pF	-	100pF	-	-	100pF	-	-
2420	-	-	47pF	-	47pF	-	-	47pF	-	-
2421/2422	-	-	47pF	-	47pF	-	-	47pF	-	-
2423	-	-	560pF	-	560pF	-	-	560pF	-	-
2424	-	-	2,2µF	-	2,2µF	-	-	2,2µF	-	-
2425	-	-	100nF	-	100nF	-	-	100nF	-	-
2438	-	-	560pF	-	560pF	-	-	560pF	-	-
3521/3522	-	-	-	-	-	-	-	-	-	-
3525	-	-	-	-	-	-	-	-	-	-
3533	-	-	1k	-	1k	-	-	1k	-	-
3534	-	-	220k	-	220k	-	-	220k	-	-
3535	-	-	2k2	-	2k2	-	-	2k2	-	-
3536	10k	10k	-	10k	-	10k	10k	-	10k	10k
3537/3538	-	-	10k	-	10k	-	-	10k	-	-
[illegible]	10k	10k	-	10k	-	10k	10k	-	10k	10k
3544	-	390R	390R	390R	390R	-	390R	390R	390R	390R
3545/3546	-	-	-	-	-	-	-	-	-	-
3561/3562	1R	1R	1R	1R	1R	1R	1R	1R	1R	1R
3591	-	-	-	-	-	-	-	-	-	-
3603	6k8	-	-	-	-	6k8	-	-	-	-
3604	8k2	-	-	-	-	8k2	-	-	-	-
3605	-	-	-	-	-	-	-	-	-	-
4415	x	x	-	x	x	x	-	x	x	x
4421	x	-	-	-	-	x	-	-	-	-
4610	-	-	-	x	-	-	x	-	-	-
4611	-	-	x	x	-	x	-	-	-	x
4612	-	x	x	x	-	-	x	-	x	x
4613	-	-	-	x	x	-	x	x	x	-
4614	-	x	x	x	-	x	x	-	x	-
4615	-	-	-	-	x	x	x	x	x	-
5415	-	-	2µ2	-	2µ2	-	-	2µ2	-	-
5417	-	-	x	-	x	-	-	x	-	-
6003	-	-	-	-	-	-	-	-	-	-
6007	1N4148	-	-	-	-	1N4148	-	-	-	-
6010	-	-	-	1N4148	-	-	1N4148	-	-	1N4148
6012	-	-	-	-	1N4148	-	1N4148	1N4148	1N4148	-
6031	-	x	x	x	x	-	x	x	x	x
6034/6037	-	-	-	-	-	-	-	-	-	-
6040	-	-	-	-	-	-	-	-	-	-
6054	-	-	-	-	1N4148	1N4148	-	1N4148	-	-
7405	-	-	x	-	x	-	-	x	-	-
7415	-	-	-	-	-	-	-	-	-	-

x = Item in use.

FRONT DISPLAY BOARD - COMPONENT VIEW

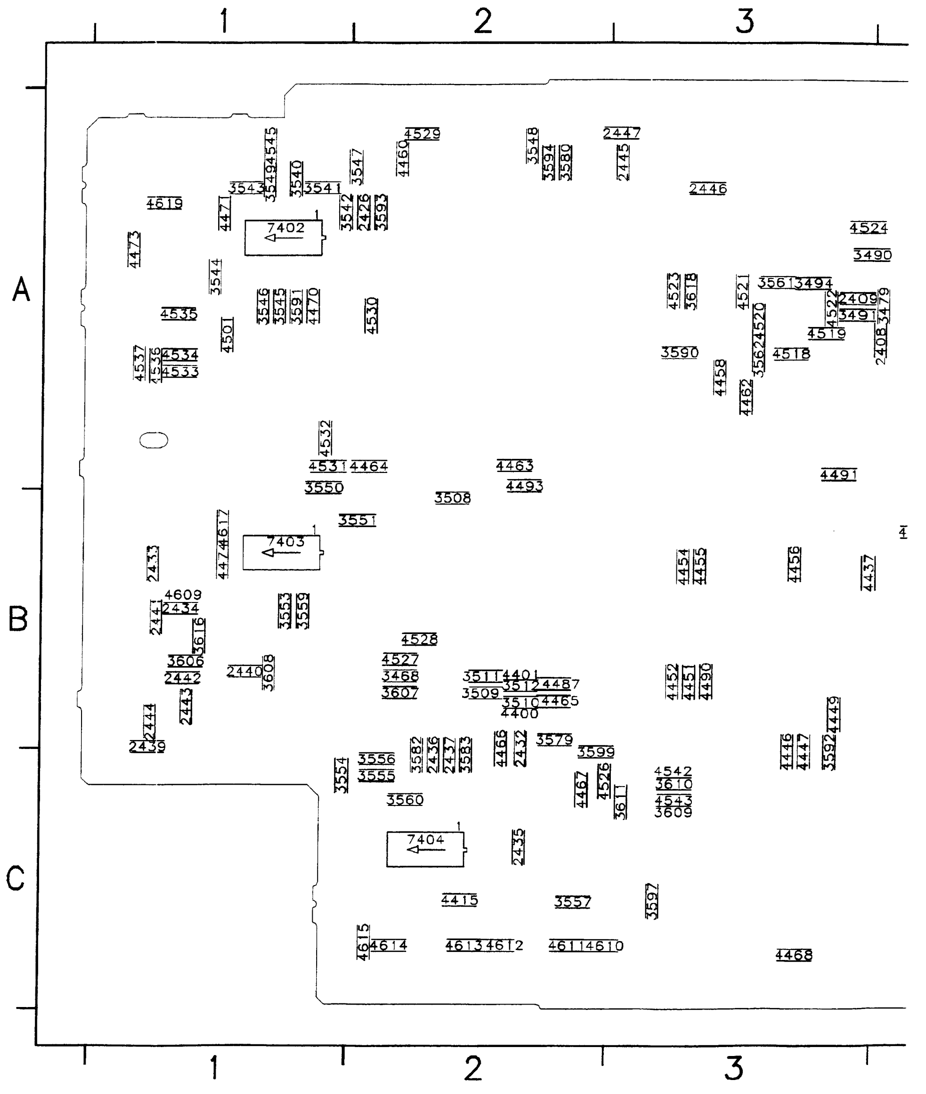
22 C3	1444 B4	1456 A6	2427 A5	3601 B3	6008 A4	6028 C5	6040 A6	6056 A5	9420 B2	9436 A1	9459 B5	9471 A6	9486 A3	9505 B7	9520 B5	9617 B5	9633 B3	9646 B4
23 B7	1445 B5	1457 A7	2428 A5	3602 B3	6010 A4	6029 A3	6041 B3	7401 B6	9422 A1	9438 B1	9460 B5	9472 A6	9487 A2	9506 C6	9521 B4	9618 A5	9634 A1	9647 A3
1400 A3	1446 C1	1458 A7	2429 A2	5412 A2	6011 A4	6030 A7	6042 B2	7406 A5	9423 A2	9440 B2	9461 A6	9473 A6	9489 A7	9507 C6	9522 B5	9621 A5	9635 A6	9648 C4
1401 C4	1447 B2	1459 B5	2430 C4	5413 B2	6012 B5	6031 A7	6043 A6	9002 B7	9424 A1	9441 B2	9462 B5	9474 A6	9491 A7	9508 C6	9523 B5	9622 B7	9636 B4	9649 B5
1402 A1	1448 C2	1460 B5	3412 B2	5414 A1	6013 A4	6032 A5	6045 A5	9410 A4	9425 A1	9446 B3	9463 B6	9475 A6	9492 A7	9509 C5	9600 A5	9625 B3	9637 A4	9650 B5
1403 C4	1449 C3	1461 B5	3493 B4	5415 B1	6014 A5	6033 B4	6046 B3	9412 A4	9426 A1	9447 B3	9464 B6	9478 A6	9495 A7	9510 C5	9610 B7	9626 A6	9638 B2	
1407 A1	1450 B3	1462 A1	3495 A5	5416 A4	6015 A2	6034 A6	6047 A6	9413 A4	9428 A2	9451 B4	9465 B6	9479 A6	9496 A7	9511 B1	9611 A7	9627 A5	9639 A1	
1409 B1	1451 C4	1463 A1	3533 B1	5417 B2	6017 A4	6035 B4	6048 B2	9414 B3	9429 A2	9453 B4	9466 B6	9480 A4	9497 B7	9512 B4	9612 C6	9628 A3	9640 C5	
1440 B1	1452 C4	1474 B1	3558 C6	6003 A4	6018 A2	6036 B3	6052 B4	9415 B3	9430 A2	9454 B4	9467 B6	9481 A3	9498 A7	9513 B4	9613 C6	9629 B3	9641 A7	
1441 B2	1453 A5	1476 C3	3588 C5	6004 A4	6020 A4	6037 A7	6053 B5	9416 B3	9433 A1	9455 B4	9468 B6	9483 A3	9499 A7	9515 B4	9614 B4	9630 A5	9642 A6	
1442 B2	1454 A6	1480 B6	3589 C6	6006 A3	6021 A4	6038 B3	6054 A4	9418 B3	9434 A1	9456 A5	9469 B6	9484 A3	9501 B7	9518 C3	9615 B4	9631 B7	9644 C2	
1443 B3	1455 A6	2424 B1	3598 B5	6007 A4	6022 A4	6039 B4	6055 A5	9419 B2	9435 A1	9457 B5	9470 B6	9485 A3	9502 B7	9519 B5	9616 A4	9632 B7	9645 A4	


1
2
3
4
5
6
7
A
B
C
mgjwchan/mentor/eco98/3139_113_33702_01
8239_210_83300
KEY
1402
RDS
NEWS
1462
1463
CLOCK
1441
Tuner
1407
1474
STANDBY
1440
DPL
1409
REVERSE
1446
REC
1447
DOWN
1448
UP
1449
CD
1442
TUNER
1443
STOP
1450
ETF
MTF
PLAY
1451
TAPE
1444
PREV
1452
NEXT
1461
AUX
1445
IR
7406
1400
Setting 2
Setting 1
IS
DPL
Kara
Mute
DBB
1453
DSC
1454
NORMAL
1455
PHANTOM
1456
STEREO
1457
IS
1458
PROGRAM
1459
VOL
1480
DUBBING
1460
7401
CDC
1403
1401

Note: This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

FRONT DISPLAY BOARD - COPPER SIDE VIEW

2400 B6	2420 B7	2442 B1	3413 A6	3443 A5	3460 A5	3497 A4	3529 B7	3547
2401 B6	2421 B6	2443 B1	3417 A6	3444 A5	3461 A5	3498 A4	3530 B7	3548
2402 B6	2422 B6	2444 B1	3418 A6	3445 A5	3463 A5	3499 A4	3531 A7	3549
2403 B6	2423 B7	2445 A3	3419 A6	3446 A5	3464 A5	3505 A7	3532 A7	3550
2404 A6	2425 B7	2446 A3	3420 A6	3447 A5	3466 A5	3506 A7	3534 B6	3551
2405 A5	2426 A2	2447 A3	3421 A6	3448 A5	3467 A5	3507 A7	3535 B6	3552
2407 B6	2431 A5	3400 B5	3422 A6	3449 A5	3468 B2	3508 B2	3536 B7	3553
2408 A4	2432 B2	3401 B5	3432 A6	3450 A5	3470 A5	3509 B2	3537 B7	3554
2409 A3	2433 B1	3402 B5	3433 A6	3451 A5	3474 A6	3510 B2	3538 B7	3555
2410 B6	2434 B1	3403 B5	3435 A6	3452 A5	3475 B5	3511 B2	3539 B6	3556
2411 B7	2435 C2	3404 B5	3436 A6	3453 A5	3478 B6	3512 B2	3540 A1	3557
2412 B7	2436 C2	3405 B5	3437 A6	3454 A5	3479 A4	3521 B7	3541 A1	3559
2415 B7	2437 C2	3406 B6	3438 A6	3455 A5	3490 A3	3522 B7	3542 A1	3560
2416 B7	2438 B7	3407 B6	3439 A5	3456 A5	3491 A3	3525 B7	3543 A1	3561
2417 B7	2439 B1	3408 B6	3440 A5	3457 A5	3492 A7	3526 A7	3544 A1	3562
2418 B7	2440 B1	3410 B6	3441 A5	3458 A5	3494 A3	3527 A7	3545 A1	3564
2419 A7	2441 B1	3411 A6	3442 A5	3459 A5	3496 A4	3528 A7	3546 A1	3578


1
2
3
A
B
C
7402
7403
7404
4619
4473
4535
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3606
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4401
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2400
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4612
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4468
4452
4451
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4454
4455
4456
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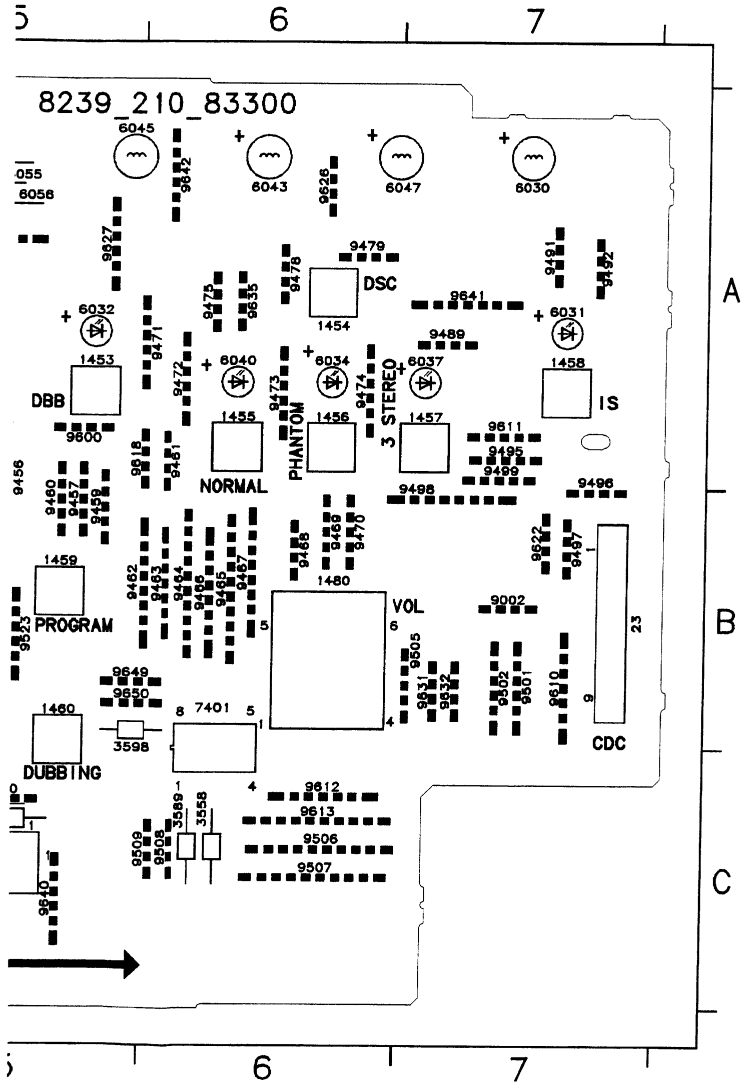
3592
4449

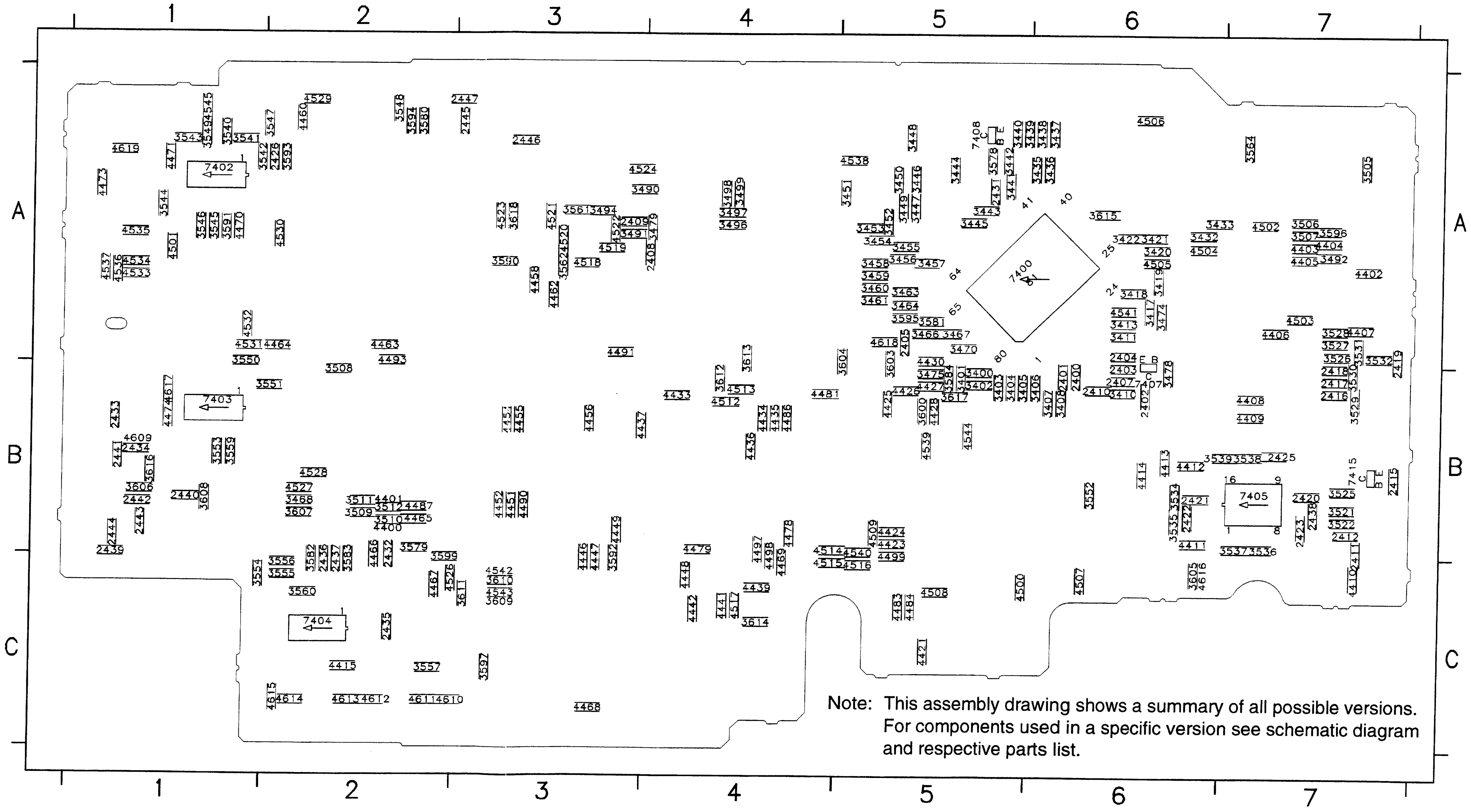
FRONT DISPLAY BOARD - COPPER SIDE VIEW

9471	A6	9486	A3	9505	B7	9520	B5	9617	B5	9633	B3	9646	B4
9472	A6	9487	A2	9506	C6	9521	B4	9618	A5	9634	A1	9647	A3
9473	A6	9489	A7	9507	C6	9522	B5	9621	A5	9635	A6	9648	C4
9474	A6	9491	A7	9508	C6	9523	B5	9622	B7	9636	B4	9649	B5
9475	A6	9492	A7	9509	C5	9600	A5	9625	B3	9637	A4	9650	B5
9478	A6	9495	A7	9510	C5	9610	B7	9626	A6	9638	B2		
9479	A6	9496	A7	9511	B1	9611	A7	9627	A5	9639	A1		
9480	A4	9497	B7	9512	B4	9612	C6	9628	A3	9640	C5		
9481	A3	9498	A7	9513	B4	9613	C6	9629	B3	9641	A7		
9483	A3	9499	A7	9515	B4	9614	B4	9630	A5	9642	A6		
9484	A3	9501	B7	9518	C3	9615	B4	9631	B7	9644	C2		
9485	A3	9502	B7	9519	B5	9616	A4	9632	B7	9645	A4		

2400	B6	2420	B7	2442	B1	3413	A6	3443	A5	3460	A5	3497	A4	3529	B7	3547	A2	3579	B2
2401	B6	2421	B6	2443	B1	3417	A6	3444	A5	3461	A5	3498	A4	3530	B7	3548	A2	3580	A2
2402	B6	2422	B6	2444	B1	3418	A6	3445	A5	3463	A5	3499	A4	3531	A7	3549	A1	3581	A5
2403	B6	2423	B7	2445	A3	3419	A6	3446	A5	3464	A5	3505	A7	3532	A7	3550	A1	3582	C2
2404	A6	2425	B7	2446	A3	3420	A6	3447	A5	3466	A5	3506	A7	3534	B6	3551	B2	3583	C2
2405	A5	2426	A2	2447	A3	3421	A6	3448	A5	3467	A5	3507	A7	3535	B6	3552	B6	3584	B5
2407	B6	2431	A5	3400	B5	3422	A6	3449	A5	3468	B2	3508	B2	3536	B7	3553	B1	3590	A3
2408	A4	2432	B2	3401	B5	3432	A6	3450	A5	3470	A5	3509	B2	3537	B7	3554	C1	3591	A1
2409	A3	2433	B1	3402	B5	3433	A6	3451	A5	3474	A6	3510	B2	3538	B7	3555	C2	3592	C3
2410	B6	2434	B1	3403	B5	3435	A6	3452	A5	3475	B5	3511	B2	3539	B6	3556	C2	3593	A2
2411	B7	2435	C2	3404	B5	3436	A6	3453	A5	3478	B6	3512	B2	3540	A1	3557	C2	3594	A2
2412	B7	2436	C2	3405	B5	3437	A6	3454	A5	3479	A4	3521	B7	3541	A1	3559	B1	3595	A5
2415	B7	2437	C2	3406	B6	3438	A6	3455	A5	3490	A3	3522	B7	3542	A1	3560	C2	3596	A7
2416	B7	2438	B7	3407	B6	3439	A5	3456	A5	3491	A3	3525	B7	3543	A1	3561	A3	3597	C3
2417	B7	2439	B1	3408	B6	3440	A5	3457	A5	3492	A7	3526	A7	3544	A1	3562	A3	3599	C2
2418	B7	2440	B1	3410	B6	3441	A5	3458	A5	3494	A3	3527	A7	3545	A1	3564	A7	3600	B5
2419	A7	2441	B1	3411	A6	3442	A5	3459	A5	3496	A4	3528	A7	3546	A1	3578	A5	3603	A5

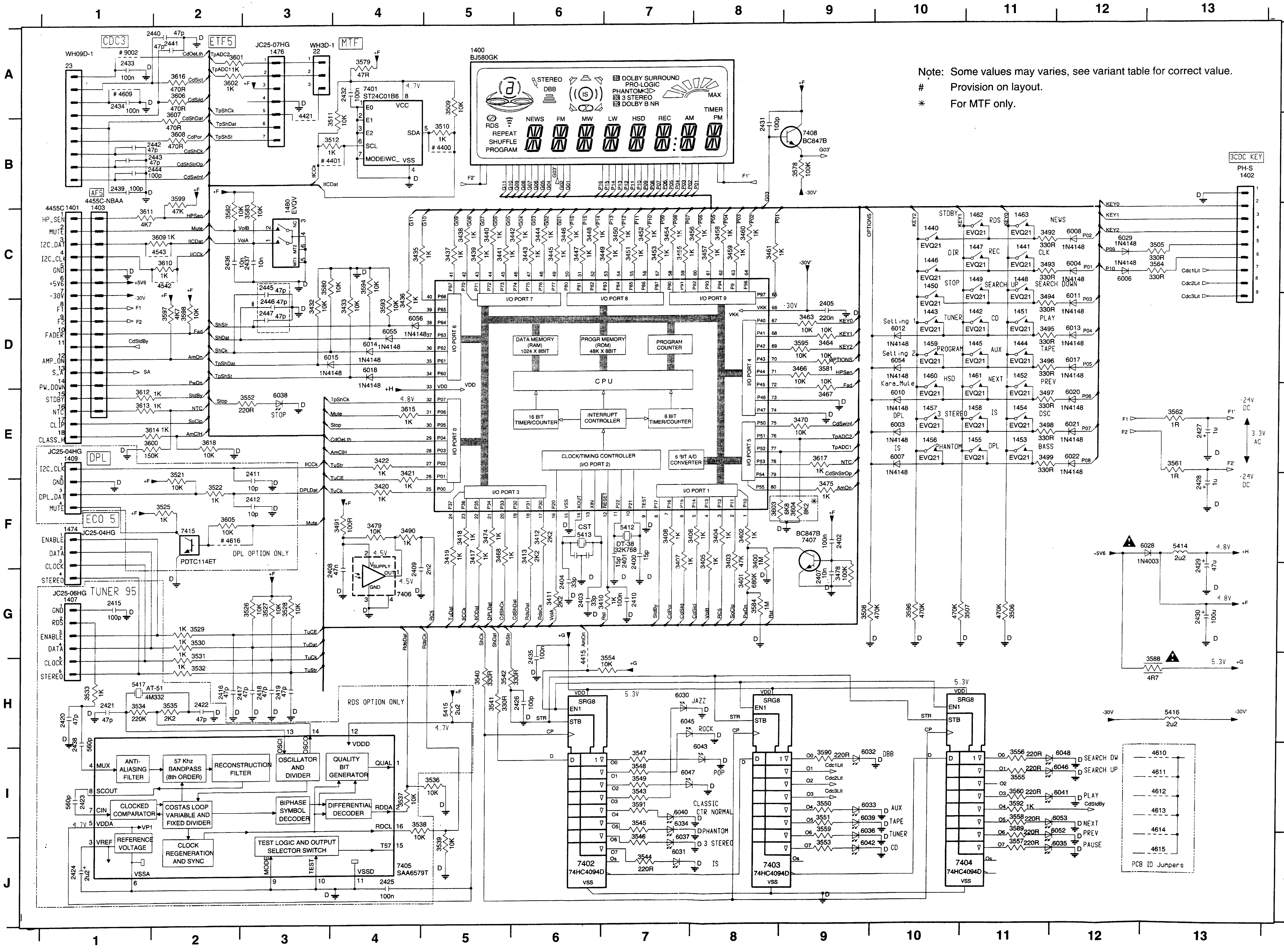
3604	A5	4402	A7	4425	B5	4451	B3	4473	A1	4502	A7	4521	A3	4539	B5	4619	A1
3605	C6	4403	A7	4426	B5	4452	B3	4474	B1	4503	A7	4522	A3	4540	B5	7400	A5
3606	B1	4404	A7	4427	B5	4454	B3	4478	B4	4504	A6	4523	A3	4541	A6	7402	A1
3607	B2	4405	A7	4428	B5	4455	B3	4479	B4	4505	A6	4524	A3	4542	C3	7403	B1
3608	B1	4406	A7	4430	A5	4456	B3	4481	B4	4506	A6	4526	C2	4543	C3	7404	C2
3609	C3	4407	A7	4433	B4	4458	A3	4483	C5	4507	C6	4527	B2	4544	B5	7405	B7
3610	C3	4408	B7	4434	B4	4460	A2	4484	C5	4508	C5	4528	B2	4545	A1	7407	B6
3611	C3	4409	B7	4435	B4	4462	A3	4486	B4	4509	B5	4529	A2	4609	B1	7408	A5
3612	B4	4410	C7	4436	B4	4463	A2	4487	B2	4512	B4	4530	A2	4610	C3	7415	B7
3613	A4	4411	B6	4437	B3	4464	A2	4490	B3	4513	B4	4531	A1	4611	C2		
3614	C4	4412	B6	4439	C4	4465	B2	4491	A3	4514	B4	4532	A1	4612	C2		
3615	A6	4413	B6	4441	C4	4466	B2	4493	A2	4515	C4	4533	A1	4613	C2		
3616	B1	4414	B6	4442	C4	4467	C2	4497	B4	4516	C5	4534	A1	4614	C2		
3617	B5	4415	C2	4446	C3	4468	C3	4498	B4	4517	C4	4535	A1	4615	C2		
3618	A3	4421	C5	4447	C3	4469	C4	4499	B5	4518	A3	4536	A1	4616	C6		
4400	B2	4423	B5	4448	C4	4470	A1	4500	C5	4519	A3	4537	A1	4617	B1		
4401	B2	4424	B5	4449	B3	4471	A1	4501	A1	4520	A3	4538	A5	4618	A5		





Note: This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

CIRCUIT DIAGRAM - FRONT DISPLAY PART


CDC3
ETF5
MTF
WH09D-1
JC25-07HG
WH3D-1
1400
BJ580GK
STEREO
DBB
RDS
REPEAT
SHUFFLE
PROGRAM
NEWS
FM
MW
LW
HSD
REC
AM
PM
DOLBY SURROUND PRO-LOGIC
PHANTOM
3 STEREO
DOLBY B NR
TIMER
MAX
7401
ST24C01B6
7408
BC847B
AF5
4455C-NBAA
JC25-04HG
DPL
ECO 5
TUNER 95
JC25-06HG
PDTC114ET
DPL OPTION ONLY
7406
RDS OPTION ONLY
7405
SAA6579T
MUX
ANTI-ALIASING FILTER
57 Khz BANDPASS (8th ORDER)
RECONSTRUCTION FILTER
OSCILLATOR AND DIVIDER
QUALITY BIT GENERATOR
CLOCKED COMPARATOR
COSTAS LOOP VARIABLE AND FIXED DIVIDER
BIPHASE SYMBOL DECODER
DIFFERENTIAL DECODER
REFERENCE VOLTAGE
CLOCK REGENERATION AND SYNC
TEST LOGIC AND OUTPUT SELECTOR SWITCH
I/O PORT 7
I/O PORT 8
I/O PORT 9
DATA MEMORY (RAM) 1024 X 8BIT
PROGR MEMORY (ROM) 48K X 8BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
8 BIT A/D CONVERTER
I/O PORT 3
I/O PORT 1
I/O PORT 0
I/O PORT 6
I/O PORT 4
I/O PORT 5
BC847B
7407
3CDC KEY
PH-S
1402
STOP
PLAY
REC
SEARCH UP
SEARCH DOWN
TUNER
CD
PROGRAM
AUX
TAPE
HSD
NEXT
PREV
3 STEREO
IS
DSC
PHANTOM
DPL
BASS
NEWS
CLK
DIR
JAZZ
ROCK
POP
CLASSIC
CTR NORMAL
PHANTOM
3 STEREO
IS
DBB
AUX
TAPE
TUNER
CD
SEARCH DW
SEARCH UP
PLAY
NEXT
PREV
PAUSE
7402
74HC4094D
7403
74HC4094D
7404
74HC4094D
PCB ID Jumpers
4610
4611
4612
4613
4614
4615

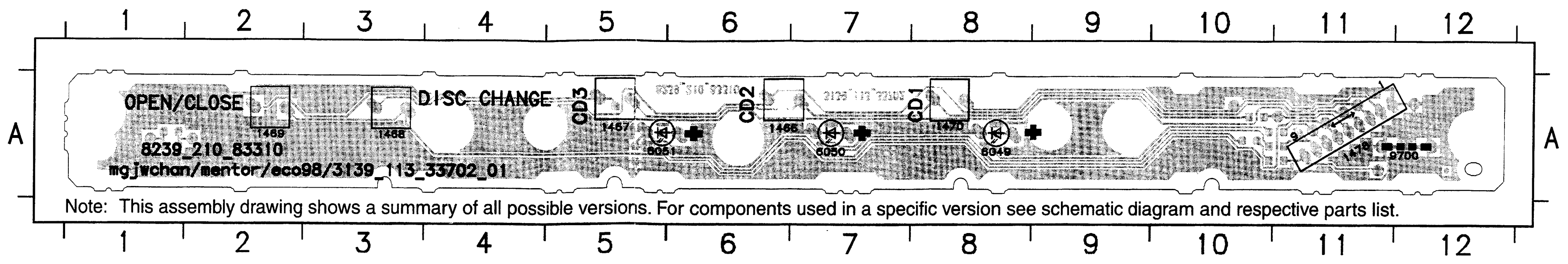
Note: Some values may varies, see variant table for correct value.
Provision on layout.
✳ For MTF only.

22	A3
23	A1
1400	A5
1401	C1
1402	B13
1403	C1
1407	G1
1409	E1
1440	C10
1441	C11
1442	D11
1443	D10
1444	D11
1445	D11
1446	C10
1447	C11
1448	C11
1449	C11
1450	C10
1451	D11
1452	D11
1453	E11
1454	E11
1455	E11
1456	E10
1457	E10
1458	E11
1459	D10
1460	D10
1461	D11
1462	C11
1463	C11
1474	F1
1476	A3
1480	C3
2400	F7
2401	F7
2402	F9
2403	G6
2404	G6
2405	D9
2407	G9
2408	G3
2409	G4
2410	G7
2411	E3
2412	F3
2415	G1
2416	H2
2417	H2
2418	H3
2419	H3
2420	H1
2421	H1
2422	H2
2423	I1
2424	J1
2425	J4
2426	H6
2427	E13
2428	F13
2429	G13
2430	G13
2431	B8
2432	A4
2433	A1
2434	A1
2435	H6
2436	C2
2437	C3
2438	H1
2439	B1
2440	A1
2441	A2
2442	B2
2443	B2
2444	B2
2445	C3
2446	D3
2447	D3
3400	F8
3401	G8
3402	F8
3403	F8
3404	F8
3405	F8
3406	F8
3407	F7
3408	F7
3410	G6
3411	G6
3412	F6
3413	F6
3417	F5
3418	F5
3419	F5
3420	F4
3421	E4
3422	E4
3432	D3
3433	D4
3435	C4
3436	D4
3437	C5
3438	C5
3439	C5
3440	C5
3441	C5
3442	C6
3443	C6
3444	C6
3445	C6
3446	C6
3447	C6
3448	C6
3449	C7
3450	C7
3451	C7
3452	C7
3453	C7
3454	C7
3455	C7
3456	C8
3457	C8
3458	C8
3459	C8
3460	C8
3461	C8
3463	D9
3464	D9
3466	D9
3467	E9
3468	F5
3470	E9
3474	F5
3475	F9
3478	G9
3479	F4
3490	F4
3491	F4
3492	C11
3493	C11
3494	D11
3495	D11
3496	D11
3497	E11
3498	E11
3499	E11
3505	C13
3506	G11
3507	G11
3508	G9
3509	A5
3510	B5
3511	B3
3512	B3
3521	E2
3522	F2
3525	F2
3526	G3
3527	G3
3528	G3
3529	G2
3530	G2
3531	G2
3532	H2
3533	H1
3534	H1
3535	H2
3536	I5
3537	I4
3538	I4
3539	J5
3540	H5
3541	H5
3542	H5
3543	I7
3544	J7
3545	I7
3546	J7
3547	I7
3548	I7
3549	I7
3550	I9
3551	I9
3552	E3
3553	J9
3554	H7
3555	I11
3556	I11
3557	J11
3558	I11
3559	I9
3560	I11
3561	E13
3562	E13
3564	C13
3578	B9
3579	A4
3580	C3
3581	D9
3582	C2
3583	C3
3584	G8
3588	H13
3589	I11
3590	I9
3591	I7
3592	I11
3593	D4
3594	C4
3595	D9
3596	G10
3597	D2
3598	D2
3599	B2
3600	E1
3601	A2
3602	A2
3603	F8
3604	F9
3605	F2
3606	A2
3607	A2
3608	B2
3609	C2
3610	C2
3611	C1
3612	E1
3613	E1
3614	E1
3615	E4
3616	A2
3617	E9
3618	E2
4400	B5
4401	B3
4415	H6
4421	B3
4542	C2
4543	C2
4609	A1
4610	I13
4611	I13
4612	I13
4613	I13
4614	J13
4615	J13
4616	F2
5412	F7
5413	F6
5414	F13
5415	H5
5416	H13
5417	H1
6003	E10
6004	C12
6006	C12
6007	E10
6008	C12
6010	E10
6011	D12
6012	D10
6013	D12
6014	D4
6015	D3
6017	D12
6018	D4
6020	E12
6021	E12
6022	E12
6028	F13
6029	C12
6030	H7
6031	J7
6032	I9
6033	I9
6034	I7
6035	J12
6036	I9
6037	J7
6038	E3
6039	I9
6040	I7
6041	I12
6042	J9
6043	I8
6045	H7
6046	I12
6047	I7
6048	I12
6052	I12
6053	I12
6054	D10
6055	D4
6056	D4
7400	F4
7401	A4
7402	J6
7403	J9
7404	J11
7405	J4
7406	G4
7407	F9
7408	B9
7415	F2
9002	A1

KEY-CDC PART

KEY-CDC BOARD - COMPONENT VIEW

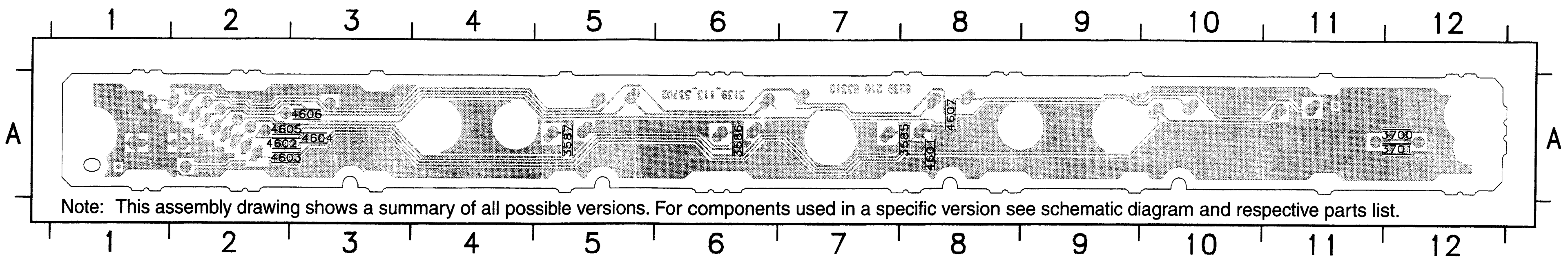
1466	A6
1467	A5
1468	A3
1469	A2
1470	A8
1478	A11
6049	A8
6050	A7
6051	A5
9700	A12


1
2
3
4
5
6
7
8
9
10
11
12
A
OPEN/CLOSE
DISC CHANGE
CD3
CD2
CD1
1469
1468
1467
1466
1470
6051
6050
6049
9700
8239_210_83310
mgjwchan/mentor/eco98/3139_113_33702_01

Note: This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

KEY-CDC BOARD - COPPER SIDE VIEW

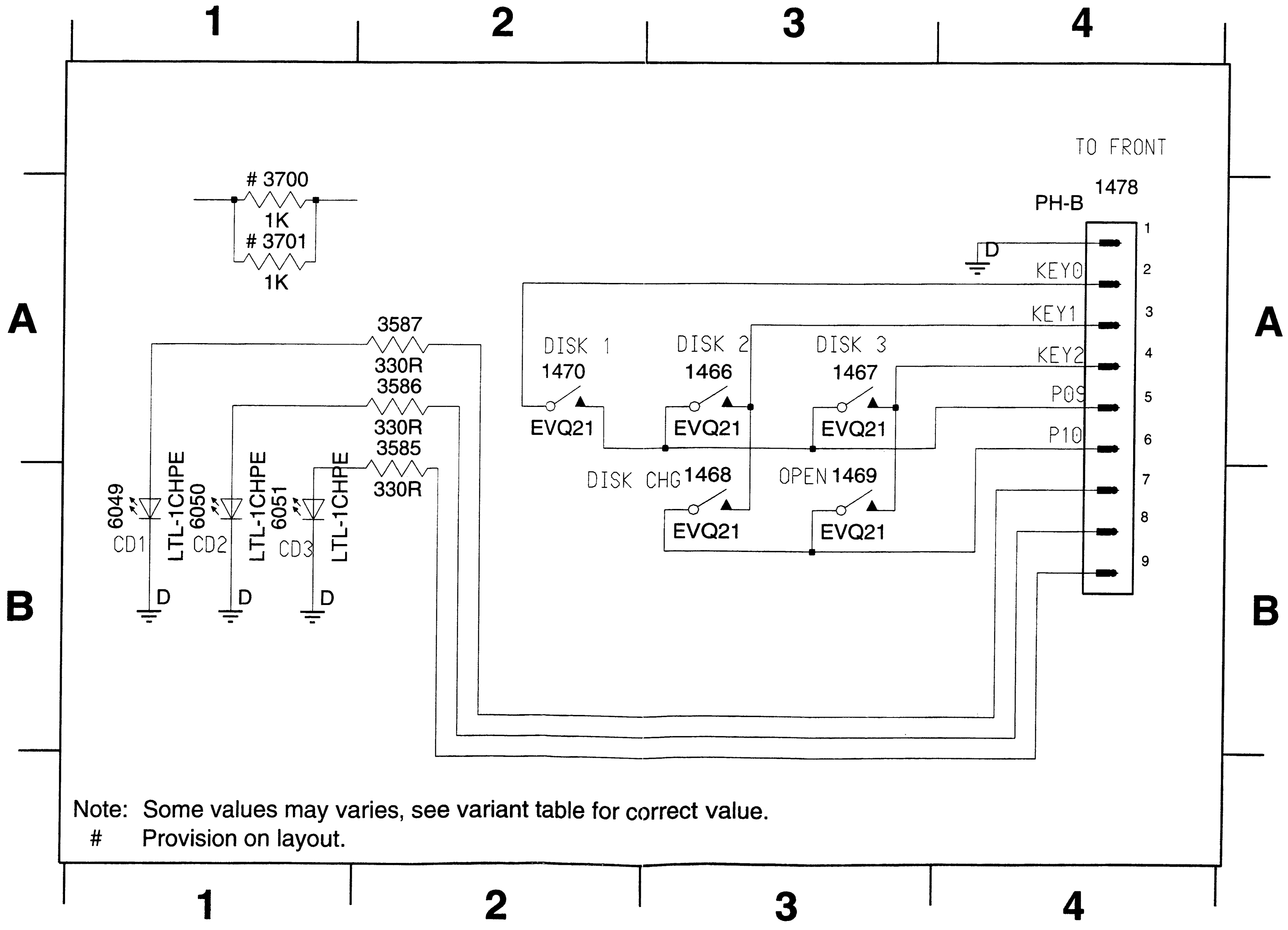
3585	A8
3586	A6
3587	A5
3700	A12
3701	A12
4601	A8
4602	A2
4603	A2
4604	A3
4605	A2
4606	A3
4607	A8


1
2
3
4
5
6
7
8
9
10
11
12
A
4606
4605
4602
4604
4603
3587
3586
3585
4601
4602
3700
3701

Note: This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

CIRCUIT DIAGRAM - KEY-CDC PART

1466	A3
1467	A3
1468	B3
1469	B3
1470	A2
1478	A4
3585	A2
3586	A2
3587	A2
3700	A1
3701	A1
6049	B1
6050	B1
6051	B1


1
2
3
4
A
B
# 3700
1K
# 3701
1K
3587
330R
3586
330R
3585
330R
6049
LTL-1CHPE
CD1
6050
LTL-1CHPE
CD2
6051
LTL-1CHPE
CD3
D
D
D
DISK 1
1470
EVQ21
DISK 2
1466
EVQ21
DISK 3
1467
EVQ21
DISK CHG 1468
EVQ21
OPEN 1469
EVQ21
TO FRONT
1478
PH-B
D
KEY0
KEY1
KEY2
P09
P10
1
2
3
4
5
6
7
8
9

Note: Some values may varies, see variant table for correct value.
# Provision on layout.

ELECTRICAL PARTS LIST - FRONT BOARD

MISCELLANEOUS

1400	4822 135 00165	FTD Display for /37
1400	4822 135 00177	FTD Display (Dot Matrix)
1403	4822 267 51238	Connector 16 Pin
1440	4822 276 13114	Tact Switch
1441	4822 276 13114	Tact Switch
1442	4822 276 13114	Tact Switch
1443	4822 276 13114	Tact Switch
1444	4822 276 13114	Tact Switch
1445	4822 276 13114	Tact Switch
1446	4822 276 13114	Tact Switch
1447	4822 276 13114	Tact Switch
1448	4822 276 13114	Tact Switch
1449	4822 276 13114	Tact Switch
1450	4822 276 13114	Tact Switch
1451	4822 276 13114	Tact Switch
1452	4822 276 13114	Tact Switch
1453	4822 276 13114	Tact Switch
1454	4822 276 13114	Tact Switch
1458	4822 276 13114	Tact Switch
1459	4822 276 13114	Tact Switch
1460	4822 276 13114	Tact Switch
1461	4822 276 13114	Tact Switch
1462	4822 276 13114	Tact Switch
1463	4822 276 13114	Tact Switch
1466	4822 276 13114	Tact Switch
1467	4822 276 13114	Tact Switch
1468	4822 276 13114	Tact Switch
1469	4822 276 13114	Tact Switch
1470	4822 276 13114	Tact Switch
1480	4822 101 21261	Rot Encoder 24P

CAPACITORS

2400	4822 122 32504	15pF 2% 50V
2401	4822 122 32504	15pF 2% 50V
2402	4822 126 10002	100nF 20% 25V
2403	5322 122 32659	33pF 5% 50V
2404	5322 122 32659	33pF 5% 50V
2405	4822 126 13473	220nF +80/-20% 50V
2407	4822 122 33177	10nF 20% 50V
2408	4822 126 13751	47nF 10% 63V
2409	4822 122 33175	2,2nF 20% 50V
2410	4822 126 10002	100nF 20% 25V
2415	5322 122 32531	100pF 5% 50V
2416	4822 126 13692	47pF 1% 63V
2417	4822 126 13692	47pF 1% 63V
2418	4822 126 13692	47pF 1% 63V
2419	4822 126 13692	47pF 1% 63V
2420	4822 126 13692	47pF 1% 63V
2421	4822 126 13692	47pF 1% 63V
2422	4822 126 13692	47pF 1% 63V
2423	4822 122 33173	560pF 10% 50V
2424	4822 124 41576	2,2µF 20% 50V
2425	4822 126 13296	100nF 10% 16V
2426	5322 122 32531	100pF 5% 50V
2427	4822 124 40242	1µF 20% 63V
2428	4822 124 40242	1µF 20% 63V
2429	4822 124 80483	47µF 20% 6,3V
2430	4822 124 42446	100µF 20% 10V
2431	5322 122 32531	100pF 5% 50V
2432	4822 126 10002	100nF 20% 25V
2433	4822 126 13296	100nF 10% 16V
2434	4822 126 13296	100nF 10% 16V
2435	4822 126 13296	100nF 10% 16V
2436	4822 122 33177	10nF 20% 50V
2437	4822 122 33177	10nF 20% 50V
2438	4822 122 33173	560pF 10% 50V
2439	5322 122 32531	100pF 5% 50V
2440	4822 126 13692	47pF 1% 63V
2441	4822 126 13692	47pF 1% 63V
2442	4822 126 13692	47pF 1% 63V
2443	4822 126 13692	47pF 1% 63V
2444	5322 122 32531	100pF 5% 50V

RESISTORS

3400	4822 051 20105	1M 5% 0,1W
3401	4822 051 20684	680k 5% 0,1W
3402	4822 051 10102	1k 2% 0,25W
3403	4822 117 10834	47k 1% 0,1W
3404	4822 051 10102	1k 2% 0,25W
3405	4822 051 10102	1k 2% 0,25W
3406	4822 051 10102	1k 2% 0,25W
3407	4822 051 10102	1k 2% 0,25W
3408	4822 051 10102	1k 2% 0,25W
3410	4822 051 10102	1k 2% 0,25W
3411	4822 117 11449	2k2 1% 0,1W
3412	4822 116 52256	2k2 5% 0,5W
3413	4822 117 11449	2k2 1% 0,1W
3417	4822 051 10102	1k 2% 0,25W
3418	4822 051 10102	1k 2% 0,25W
3419	4822 051 10102	1k 2% 0,25W
3420	4822 051 10102	1k 2% 0,25W
3421	4822 051 10102	1k 2% 0,25W
3422	4822 051 10102	1k 2% 0,25W
3432	4822 117 10833	10k 1% 0,1W
3433	4822 117 10833	10k 1% 0,1W
3435	4822 051 10102	1k 2% 0,25W
3436	4822 051 10102	1k 2% 0,25W
3437	4822 051 10102	1k 2% 0,25W
3438	4822 051 10102	1k 2% 0,25W
3439	4822 051 10102	1k 2% 0,25W
3440	4822 051 10102	1k 2% 0,25W
3441	4822 051 10102	1k 2% 0,25W
3442	4822 051 10102	1k 2% 0,25W
3443	4822 051 10102	1k 2% 0,25W

ELECTRICAL PARTS LIST - FRONT BOARD

3444	4822 051 10102		1k 2% 0,25W
3445	4822 051 10102		1k 2% 0,25W
3446	4822 051 10102		1k 2% 0,25W
3447	4822 051 10102		1k 2% 0,25W
3448	4822 051 10102		1k 2% 0,25W
3449	4822 051 10102		1k 2% 0,25W
3450	4822 051 10102		1k 2% 0,25W
3451	4822 051 10102		1k 2% 0,25W
3452	4822 051 10102		1k 2% 0,25W
3453	4822 051 10102		1k 2% 0,25W
3454	4822 051 10102		1k 2% 0,25W
3455	4822 051 10102		1k 2% 0,25W
3456	4822 051 10102		1k 2% 0,25W
3457	4822 051 10102		1k 2% 0,25W
3458	4822 051 10102		1k 2% 0,25W
3459	4822 051 10102		1k 2% 0,25W
3460	4822 051 10102		1k 2% 0,25W
3461	4822 051 10102		1k 2% 0,25W
3463	4822 117 10833		10k 1% 0,1W
3464	4822 117 10833		10k 1% 0,1W
3466	4822 117 10833		10k 1% 0,1W
3467	4822 117 10833		10k 1% 0,1W
3468	4822 051 10102		1k 2% 0,25W
3470	4822 117 10833		10k 1% 0,1W
3474	4822 051 10102		1k 2% 0,25W
3475	4822 051 10102		1k 2% 0,25W
3478	4822 051 20104		100k 5% 0,1W
3479	4822 117 10833		10k 1% 0,1W
3490	4822 051 10102		1k 2% 0,25W
3491	4822 051 20101		100R 5% 0,1W
3492	4822 051 20331		330R 5% 0,1W
3493	4822 116 52219		330R 5% 0,5W
3494	4822 051 20331		330R 5% 0,1W
3495	4822 116 52219		330R 5% 0,5W
3496	4822 051 20331		330R 5% 0,1W
3497	4822 051 20331		330R 5% 0,1W
3498	4822 051 20331		330R 5% 0,1W
3499	4822 051 20331		330R 5% 0,1W
3505	4822 051 20331		330R 5% 0,1W
3506	4822 051 20474		470k 5% 0,1W
3507	4822 051 20474		470k 5% 0,1W
3508	4822 051 20474		470k 5% 0,1W
3509	4822 117 10833		10k 1% 0,1W
3510	4822 051 10102		1k 2% 0,25W
3511	4822 117 10833		10k 1% 0,1W
3512	4822 051 10102		1k 2% 0,25W
3526	4822 117 10833		10k 1% 0,1W
3527	4822 117 10833		10k 1% 0,1W
3528	4822 117 10833		10k 1% 0,1W
3529	4822 051 10102		1k 2% 0,25W
3530	4822 051 10102		1k 2% 0,25W
3531	4822 051 10102		1k 2% 0,25W
3532	4822 051 10102		1k 2% 0,25W
3533	4822 050 11002		1k 1% 0,4W
3534	4822 051 20224		220k 5% 0,1W
3535	4822 117 11449		2k2 1% 0,1W
3536	4822 117 10833		10k 1% 0,1W
3537	4822 117 10833		10k 1% 0,1W
3538	4822 117 10833		10k 1% 0,1W
3539	4822 117 10833		10k 1% 0,1W
3540	4822 051 20331		330R 5% 0,1W
3541	4822 051 20331		330R 5% 0,1W
3542	4822 051 20331		330R 5% 0,1W
3543	4822 051 20391		390R 5% 0,1W
3544	4822 117 11503		220R 1% 0.1W
3547	4822 051 20391		390R 5% 0,1W
3548	4822 051 20391		390R 5% 0,1W
3549	4822 051 20391		390R 5% 0,1W
3550	4822 051 20391		390R 5% 0,1W
3551	4822 051 20391		390R 5% 0,1W
3552	4822 117 11503		220R 1% 0.1W
3553	4822 051 20391		390R 5% 0,1W
3554	4822 117 10833		10k 1% 0,1W
3555	4822 117 11503		220R 1% 0.1W
3556	4822 117 11503		220R 1% 0.1W
3557	4822 117 11503		220R 1% 0.1W
3558	4822 116 83872		220R 5% 0,5W
3559	4822 051 20391		390R 5% 0,1W
3560	4822 117 11503		220R 1% 0.1W
3561	4822 051 20108		1R 5% 0,1W
3562	4822 051 20108		1R 5% 0,1W
3564	4822 051 20331		330R 5% 0,1W
3578	4822 051 20104		100k 5% 0,1W
3579	4822 051 20479		47R 5% 0,1W
3580	4822 117 10833		10k 1% 0,1W
3581	4822 117 10833		10k 1% 0,1W
3582	4822 117 10833		10k 1% 0,1W
3583	4822 117 10833		10k 1% 0,1W
3584	4822 051 20105		1M 5% 0,1W
3585	4822 051 20331		330R 5% 0,1W
3586	4822 051 20331		330R 5% 0,1W
3587	4822 051 20331		330R 5% 0,1W
3588	4822 052 10478	⚠	4R7 5% 0,33W
3589	4822 116 83872		220R 5% 0,5W
3590	4822 117 11503		220R 1% 0.1W
3592	4822 051 10102		1k 2% 0,25W
3593	4822 117 10833		10k 1% 0,1W
3594	4822 117 10833		10k 1% 0,1W
3595	4822 117 10833		10k 1% 0,1W
3596	4822 051 20474		470k 5% 0,1W
3597	4822 117 10833		10k 1% 0,1W
3598	4822 116 83864		10k 5% 0,5W
3599	4822 117 10834		47k 1% 0,1W
3600	4822 051 20154		150k 5% 0,1W

ELECTRICAL PARTS LIST - FRONT BOARD

RESISTORS

3601	4822 050 11002	1k 1% 0,4W
3602	4822 050 11002	1k 1% 0,4W
3606	4822 051 20471	470R 5% 0,1W
3607	4822 051 20471	470R 5% 0,1W
3608	4822 051 20471	470R 5% 0,1W
3609	4822 051 10102	1k 2% 0,25W
3610	4822 051 10102	1k 2% 0,25W
3611	4822 051 20472	4k7 5% 0,1W
3612	4822 051 10102	1k 2% 0,25W
3613	4822 051 10102	1k 2% 0,25W
3614	4822 051 10102	1k 2% 0,25W
3615	4822 051 10102	1k 2% 0,25W
3616	4822 051 20471	470R 5% 0,1W
3617	4822 051 10102	1k 2% 0,25W
3618	4822 117 10833	10k 1% 0,1W
4402	4822 051 20008	0R Jumper 0805
4403	4822 051 20008	0R Jumper 0805
4404	4822 051 20008	0R Jumper 0805
4405	4822 051 20008	0R Jumper 0805
4406	4822 051 20008	0R Jumper 0805
4407	4822 051 20008	0R Jumper 0805
4408	4822 051 20008	0R Jumper 0805
4409	4822 051 20008	0R Jumper 0805
4410	4822 051 20008	0R Jumper 0805
4411	4822 051 20008	0R Jumper 0805
4412	4822 051 20008	0R Jumper 0805
4413	4822 051 20008	0R Jumper 0805
4414	4822 051 20008	0R Jumper 0805
4415	4822 051 20008	0R Jumper 0805
4423	4822 051 20008	0R Jumper 0805
4424	4822 051 20008	0R Jumper 0805
4425	4822 051 20008	0R Jumper 0805
4426	4822 051 20008	0R Jumper 0805
4427	4822 051 20008	0R Jumper 0805
4428	4822 051 20008	0R Jumper 0805
4430	4822 051 20008	0R Jumper 0805
4433	4822 051 20008	0R Jumper 0805
4434	4822 051 20008	0R Jumper 0805
4435	4822 051 20008	0R Jumper 0805
4436	4822 051 20008	0R Jumper 0805
4437	4822 051 20008	0R Jumper 0805
4439	4822 051 20008	0R Jumper 0805
4441	4822 051 20008	0R Jumper 0805
4442	4822 051 20008	0R Jumper 0805
4446	4822 051 20008	0R Jumper 0805
4447	4822 051 20008	0R Jumper 0805
4448	4822 051 20008	0R Jumper 0805
4449	4822 051 20008	0R Jumper 0805
4451	4822 051 20008	0R Jumper 0805
4452	4822 051 20008	0R Jumper 0805
4454	4822 051 20008	0R Jumper 0805
4455	4822 051 20008	0R Jumper 0805
4456	4822 051 20008	0R Jumper 0805
4458	4822 051 20008	0R Jumper 0805
4460	4822 051 20008	0R Jumper 0805
4462	4822 051 20008	0R Jumper 0805
4463	4822 051 20008	0R Jumper 0805
4464	4822 051 20008	0R Jumper 0805
4465	4822 051 20008	0R Jumper 0805
4466	4822 051 20008	0R Jumper 0805
4467	4822 051 20008	0R Jumper 0805
4468	4822 051 20008	0R Jumper 0805
4469	4822 051 20008	0R Jumper 0805
4470	4822 051 20008	0R Jumper 0805
4471	4822 051 20008	0R Jumper 0805
4473	4822 051 20008	0R Jumper 0805
4474	4822 051 20008	0R Jumper 0805
4478	4822 051 20008	0R Jumper 0805
4479	4822 051 20008	0R Jumper 0805
4481	4822 051 20008	0R Jumper 0805
4483	4822 051 20008	0R Jumper 0805
4484	4822 051 20008	0R Jumper 0805
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4490	4822 051 20008	0R Jumper 0805
4491	4822 051 20008	0R Jumper 0805
4493	4822 051 20008	0R Jumper 0805
4497	4822 051 20008	0R Jumper 0805
4498	4822 051 20008	0R Jumper 0805
4499	4822 051 20008	0R Jumper 0805
4500	4822 051 20008	0R Jumper 0805
4501	4822 051 20008	0R Jumper 0805
4502	4822 051 20008	0R Jumper 0805
4503	4822 051 20008	0R Jumper 0805
4504	4822 051 20008	0R Jumper 0805
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4513	4822 051 20008	0R Jumper 0805
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4515	4822 051 20008	0R Jumper 0805
4516	4822 051 20008	0R Jumper 0805
4517	4822 051 20008	0R Jumper 0805
4518	4822 051 20008	0R Jumper 0805
4519	4822 051 20008	0R Jumper 0805
4520	4822 051 20008	0R Jumper 0805
4521	4822 051 20008	0R Jumper 0805
4522	4822 051 20008	0R Jumper 0805
4523	4822 051 20008	0R Jumper 0805
4524	4822 051 20008	0R Jumper 0805
4526	4822 051 20008	0R Jumper 0805

ELECTRICAL PARTS LIST - FRONT BOARD

4527	4822 051 20008	0R Jumper 0805
4528	4822 051 20008	0R Jumper 0805
4529	4822 051 20008	0R Jumper 0805
4530	4822 051 20008	0R Jumper 0805
4531	4822 051 20008	0R Jumper 0805
4532	4822 051 20008	0R Jumper 0805
4533	4822 051 20008	0R Jumper 0805
4534	4822 051 20008	0R Jumper 0805
4535	4822 051 20008	0R Jumper 0805
4536	4822 051 20008	0R Jumper 0805
4537	4822 051 20008	0R Jumper 0805
4538	4822 051 20008	0R Jumper 0805
4539	4822 051 20008	0R Jumper 0805
4540	4822 051 20008	0R Jumper 0805
4541	4822 051 20008	0R Jumper 0805
4542	4822 051 20008	0R Jumper 0805
4543	4822 051 20008	0R Jumper 0805
4544	4822 051 20008	0R Jumper 0805
4545	4822 051 20008	0R Jumper 0805
4601	4822 051 20008	0R Jumper 0805
4602	4822 051 20008	0R Jumper 0805
4603	4822 051 20008	0R Jumper 0805
4604	4822 051 20008	0R Jumper 0805
4605	4822 051 20008	0R Jumper 0805
4606	4822 051 20008	0R Jumper 0805
4607	4822 051 20008	0R Jumper 0805
4611	4822 051 20008	0R Jumper 0805
4612	4822 051 20008	0R Jumper 0805
4614	4822 051 20008	0R Jumper 0805
4617	4822 051 20008	0R Jumper 0805
4618	4822 051 20008	0R Jumper 0805
4619	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5412	4822 242 70938	X'tal Resonator 32,768kHZ
5413	4822 242 72066	Ceramic Resonator
5414	4822 157 11477	Fixed Inductor 2μ2 5%
5415	4822 157 11477	Fixed Inductor 2μ2 5%
5416	4822 157 11477	Fixed Inductor 2μ2 5%
5417	4822 242 72195	QUARZ 4,332 MHZ

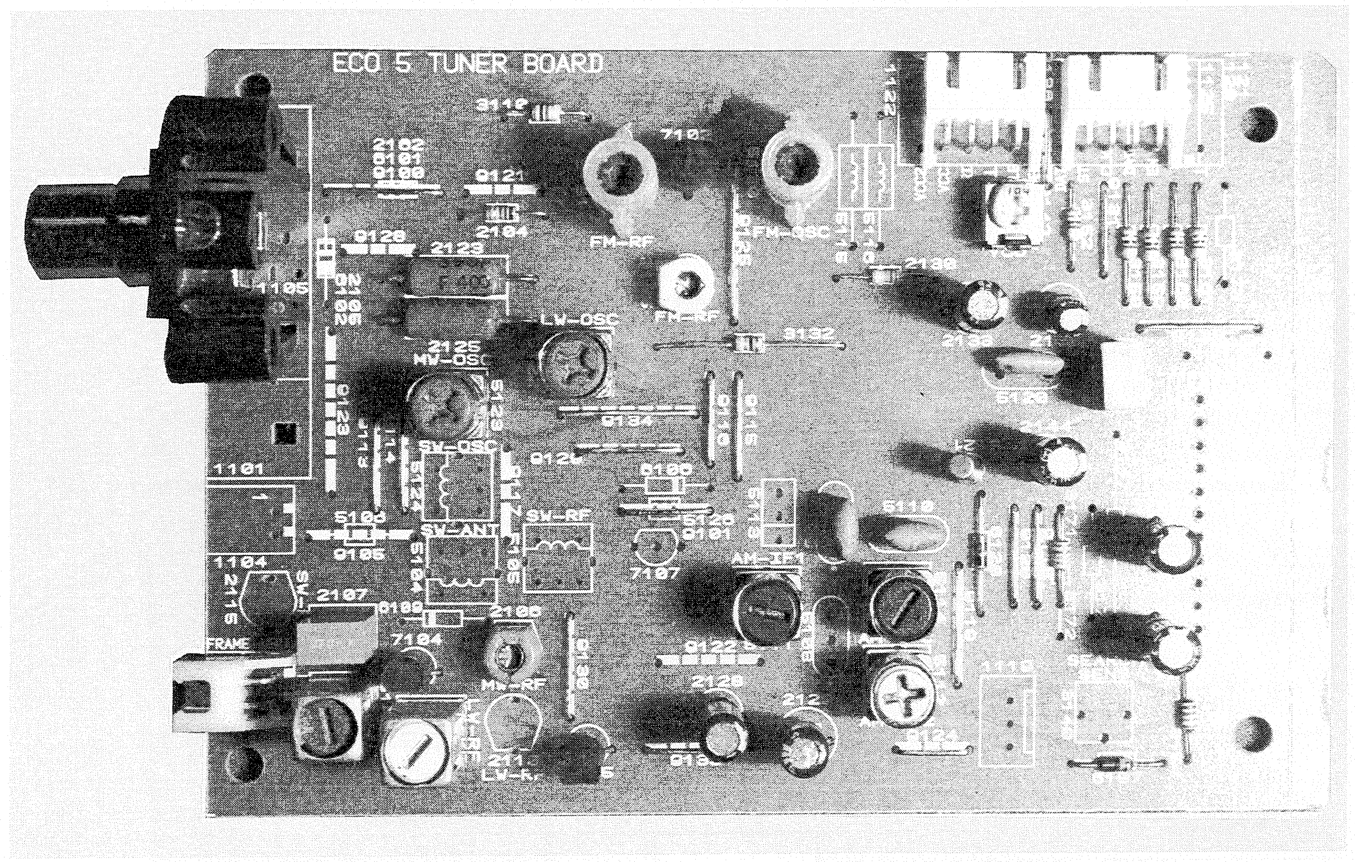
DIODES

6004	4822 130 30621	1N4148
6006	4822 130 30621	1N4148
6008	4822 130 30621	1N4148
6010	4822 130 30621	1N4148
6011	4822 130 30621	1N4148
6013	4822 130 30621	1N4148
6014	4822 130 30621	1N4148
6015	4822 130 30621	1N4148
6017	4822 130 30621	1N4148
6018	4822 130 30621	1N4148
6020	4822 130 30621	1N4148
6021	4822 130 30621	1N4148
6022	4822 130 30621	1N4148
6028	4822 130 31878 ⚠	1N4003G
6029	4822 130 30621	1N4148
6030	4822 130 11137	LTL-307C-001
6031	4822 130 10791	LTL-1CHGE
6032	4822 130 10791	LTL-1CHGE
6033	4822 130 10792	LTL-1CHPE
6035	4822 130 10791	LTL-1CHGE
6036	4822 130 10792	LTL-1CHPE
6038	4822 130 10791	LTL-1CHGE
6039	4822 130 10792	LTL-1CHPE
6041	4822 130 10791	LTL-1CHGE
6042	4822 130 10792	LTL-1CHPE
6043	4822 130 11137	LTL-307C-001
6045	4822 130 11137	LTL-307C-001
6046	4822 130 10791	LTL-1CHGE
6047	4822 130 11137	LTL-307C-001
6048	4822 130 10791	LTL-1CHGE
6049	4822 130 10792	LTL-1CHPE
6050	4822 130 10792	LTL-1CHPE
6051	4822 130 10792	LTL-1CHPE
6052	4822 130 10791	LTL-1CHGE
6053	4822 130 10791	LTL-1CHGE
6055	4822 130 30621	1N4148
6056	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7400	4822 209 16158	TMP87CS71F - '530S51611' for /37
7400	4822 209 16223	TMP87CS71F - '530S51661'
7401	4822 209 31508	ST24C01B1
7402	4822 209 15449	74HC4094D
7403	4822 209 15449	74HC4094D
7404	4822 209 15449	74HC4094D
7405	4822 209 31981	SAA6579T
7406	4822 130 10165	GP1U28XP
7407	4822 130 60511	BC847B
7408	4822 130 60511	BC847B

Note: Only the parts mentioned in this list are normal service spare parts.


ECO 5 TUNER BOARD
FM-RF
FM-OSC
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
AM-IF1
MW-RF
LW-R
FRAME
1101
1104
1105

TUNER BOARD ECO5

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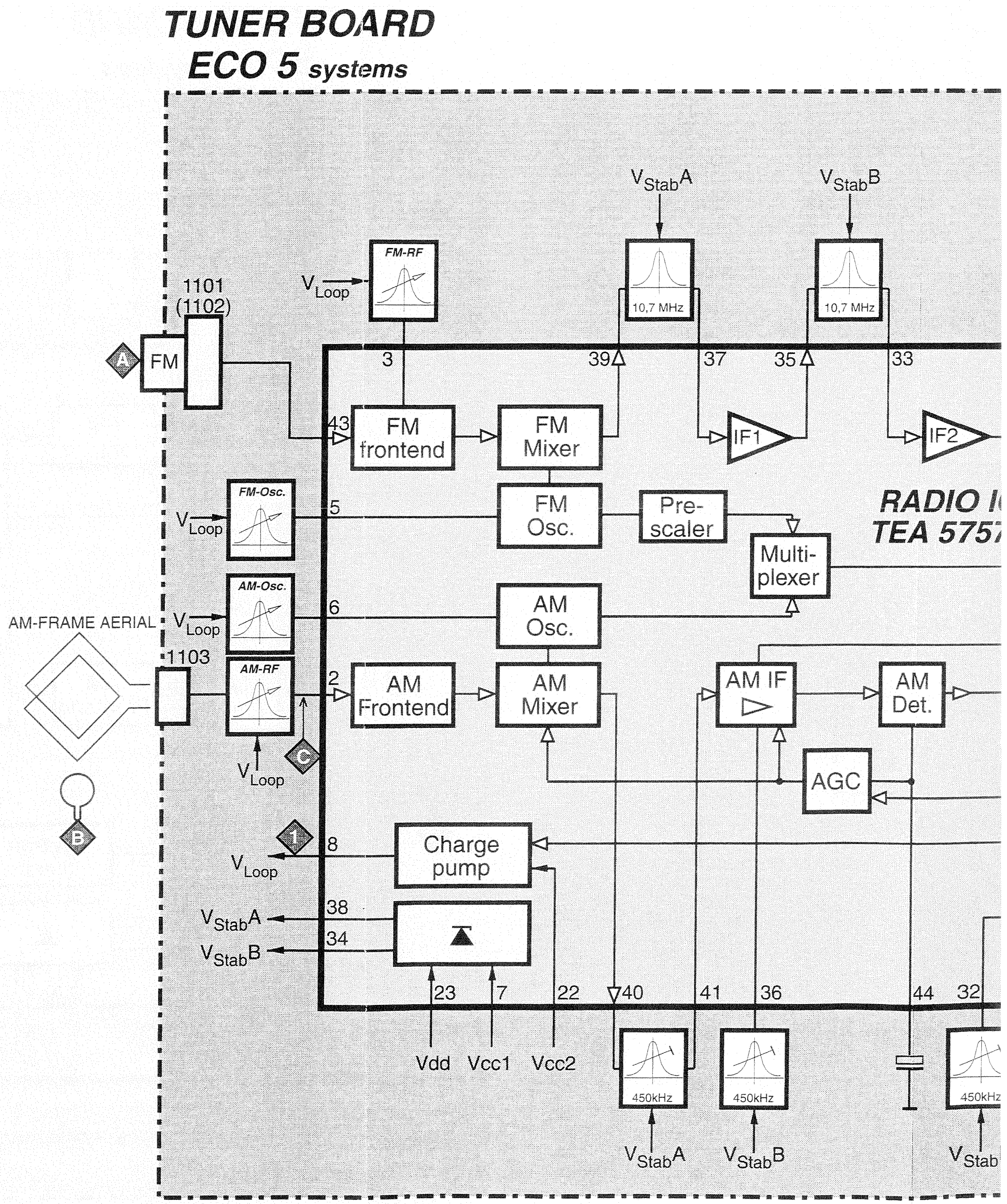
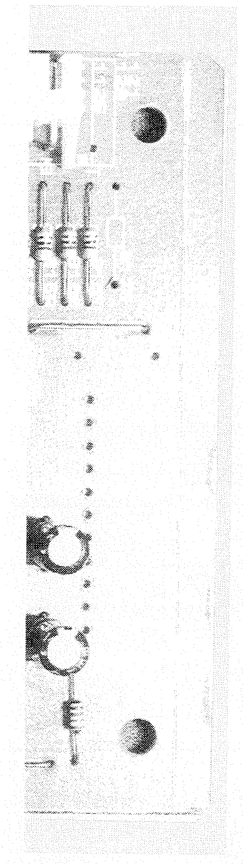
Component layout 7B-2
Circuit diagram 7B-3
Partslist 7B-4

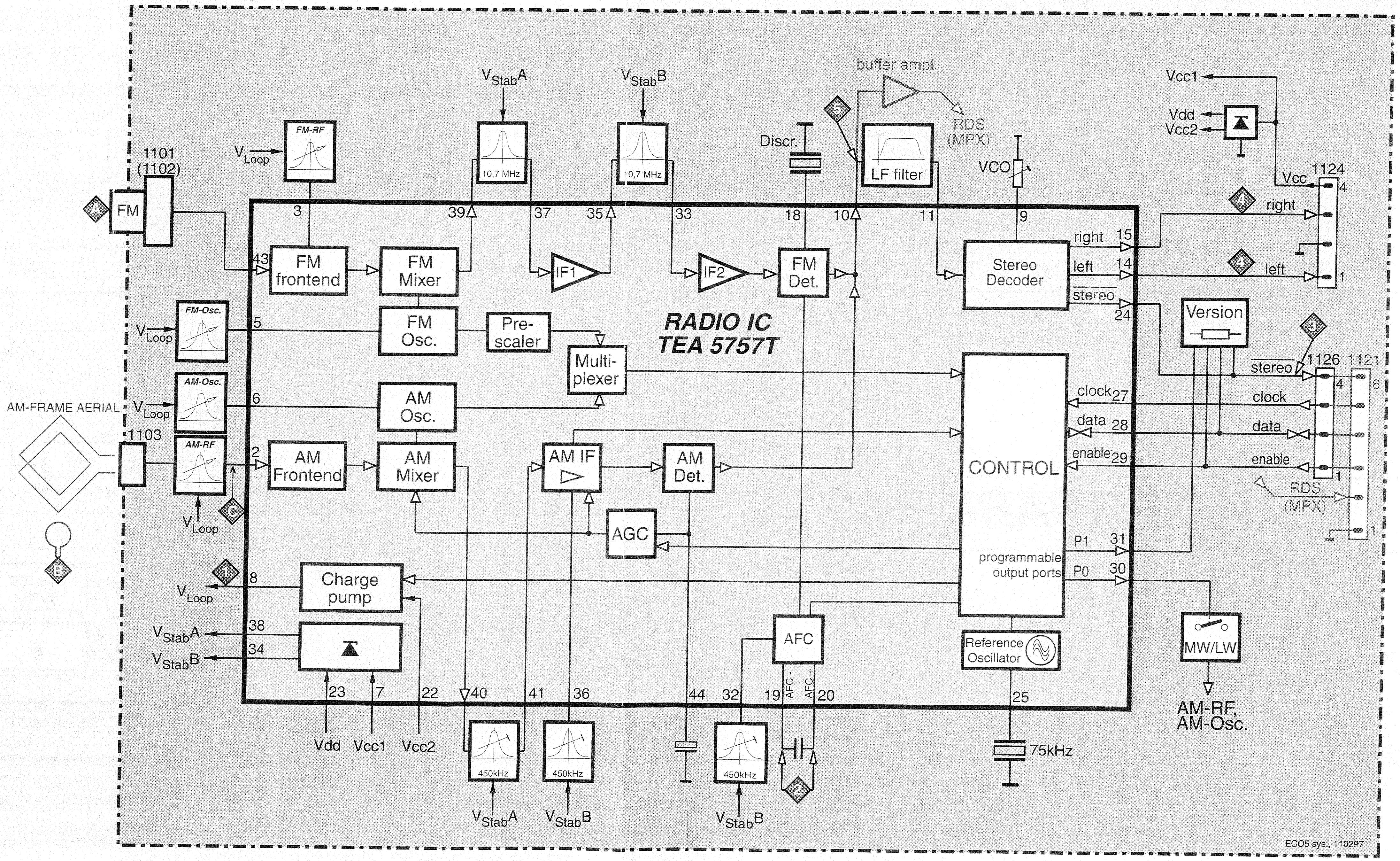
BLOCKDIAGRAM


TUNER BOARD
ECO 5 systems
V Stab A
V Stab B
FM-RF
10,7 MHz
10,7 MHz
1101
(1102)
V Loop
FM
3
39
37
35
33
43
FM frontend
FM Mixer
IF1
IF2
RADIO I
TEA 575
FM-Osc.
5
FM Osc.
Pre-scaler
Multi-plexer
AM-Osc.
AM-FRAME AERIAL
6
AM Osc.
1103
AM-RF
2
AM Frontend
AM Mixer
AM IF
AM Det.
AGC
C
A
B
1
8
Charge pump
38
34
23
7
22
40
41
36
44
32
Vdd
Vcc1
Vcc2
450kHz
450kHz
450kHz

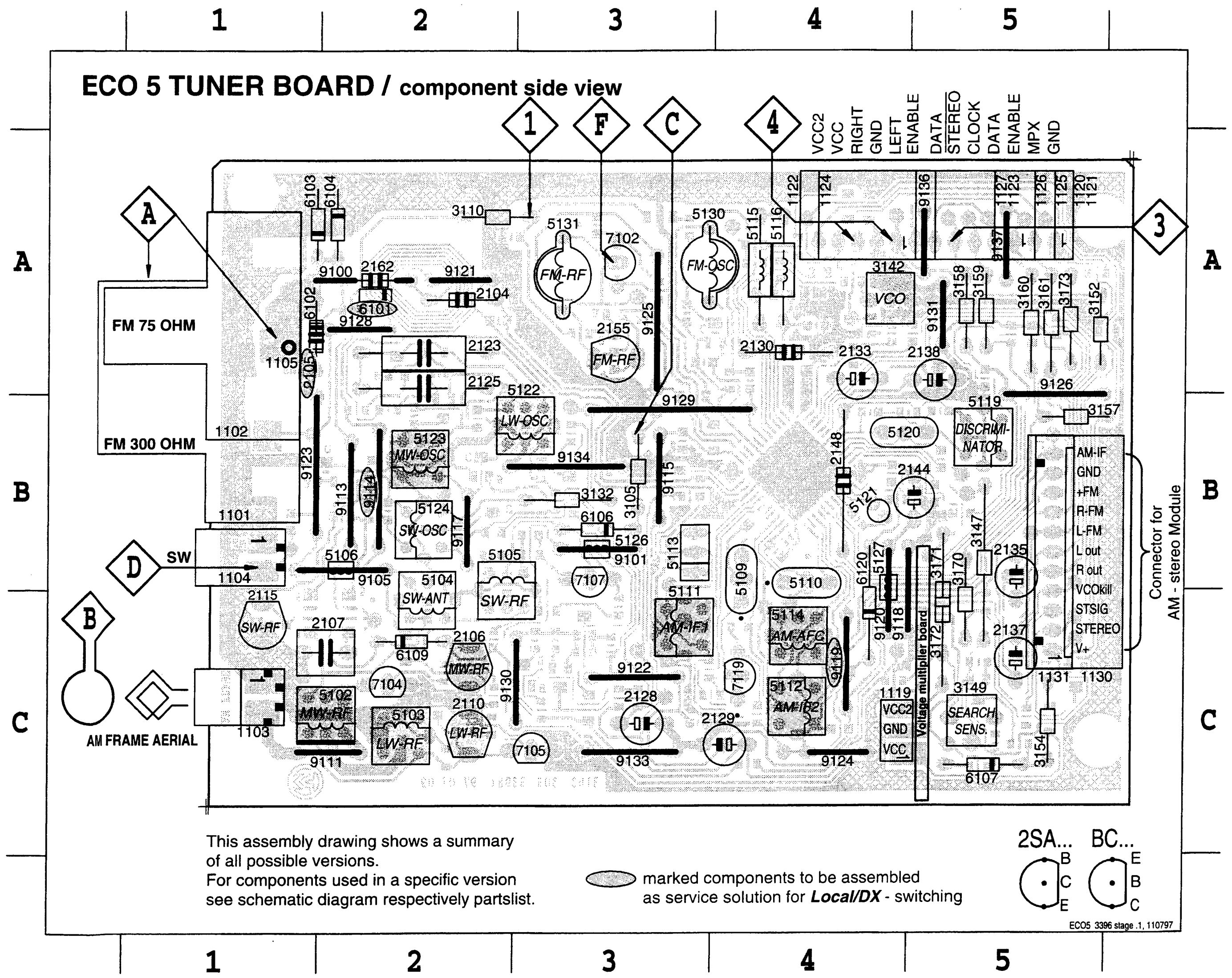
BLOCKDIAGRAM



TUNER BOARD
ECO 5 systems


RADIO IC
TEA 5757T
FM
1101
(1102)
A
V_Loop
FM-RF
FM-Osc.
AM-Osc.
AM-RF
AM-FRAME AERIAL
1103
B
C
1
V_StabA
V_StabB
10,7 MHz
10,7 MHz
buffer ampl.
RDS
(MPX)
5
Discr.
LF filter
VCO
Vcc1
Vdd
Vcc2
Vcc
1124
4
right
left
1
3
43
39
37
35
33
18
10
11
9
FM frontend
FM Mixer
IF1
IF2
FM Det.
Stereo Decoder
right 15
left 14
stereo 24
5
FM Osc.
Pre-scaler
Multi-plexer
6
AM Osc.
2
AM Frontend
AM Mixer
AM IF
AM Det.
AGC
CONTROL
Version
stereo
1126
1121
6
clock 27
clock
data 28
data
enable 29
enable
RDS
(MPX)
P1 31
P0 30
programmable output ports
8
Charge pump
38
34
23
7
22
40
41
36
44
32
19
AFC -
AFC +
20
25
AFC
Reference Oscillator
MW/LW
AM-RF,
AM-Osc.
Vdd
Vcc1
Vcc2
450kHz
450kHz
450kHz
2
75kHz
ECO5 sys., 110297

1101 A1	2106 C2	2137 C5	3149 C5	3173 A5	5114 C4	5130 A3	7104 C2	9117 B2	9129 B3
1102 A1	2107 C2	2138 A5	3152 A5	5102 C2	5115 A4	5131 A3	7105 C3	9118 B4	9130 C3
1103 C1	2110 C2	2144 B5	3154 C5	5103 C2	5116 A4	6101 A2	7107 B3	9119 C4	9131 A5
1104 B1	2115 C1	2148 B4	3157 B5	5104 C2	5119 B5	6102 A1	7119 C4	9120 B4	9133 C3
1105 A1	2123 A2	2155 A3	3158 A5	5105 B2	5120 B4	6103 A1	9100 A2	9121 A2	9134 B3
1119 C5	2125 A2	2162 A2	3159 A5	5106 B2	5121 B4	6104 A2	9101 B3	9122 C3	9136 A5
1120 A5	2128 C3	3105 B3	3160 A5	5109 B4	5122 B3	6106 B3	9105 B2	9123 B1	9137 A5
1130 B5	2129 C4	3110 A2	3161 A5	5110 B4	5123 B2	6107 C5	9111 C2	9124 C4	
1131 B5	2130 A4	3132 B3	3170 C5	5111 C3	5124 B2	6109 C2	9113 B2	9125 A3	
2104 A2	2133 A4	3142 A4	3171 C5	5112 C4	5126 B3	6120 C4	9114 B2	9126 B5	
2105 A1	2135 B5	3147 B5	3172 C5	5113 B3	5127 B4	7102 A3	9115 B3	9128 A2	



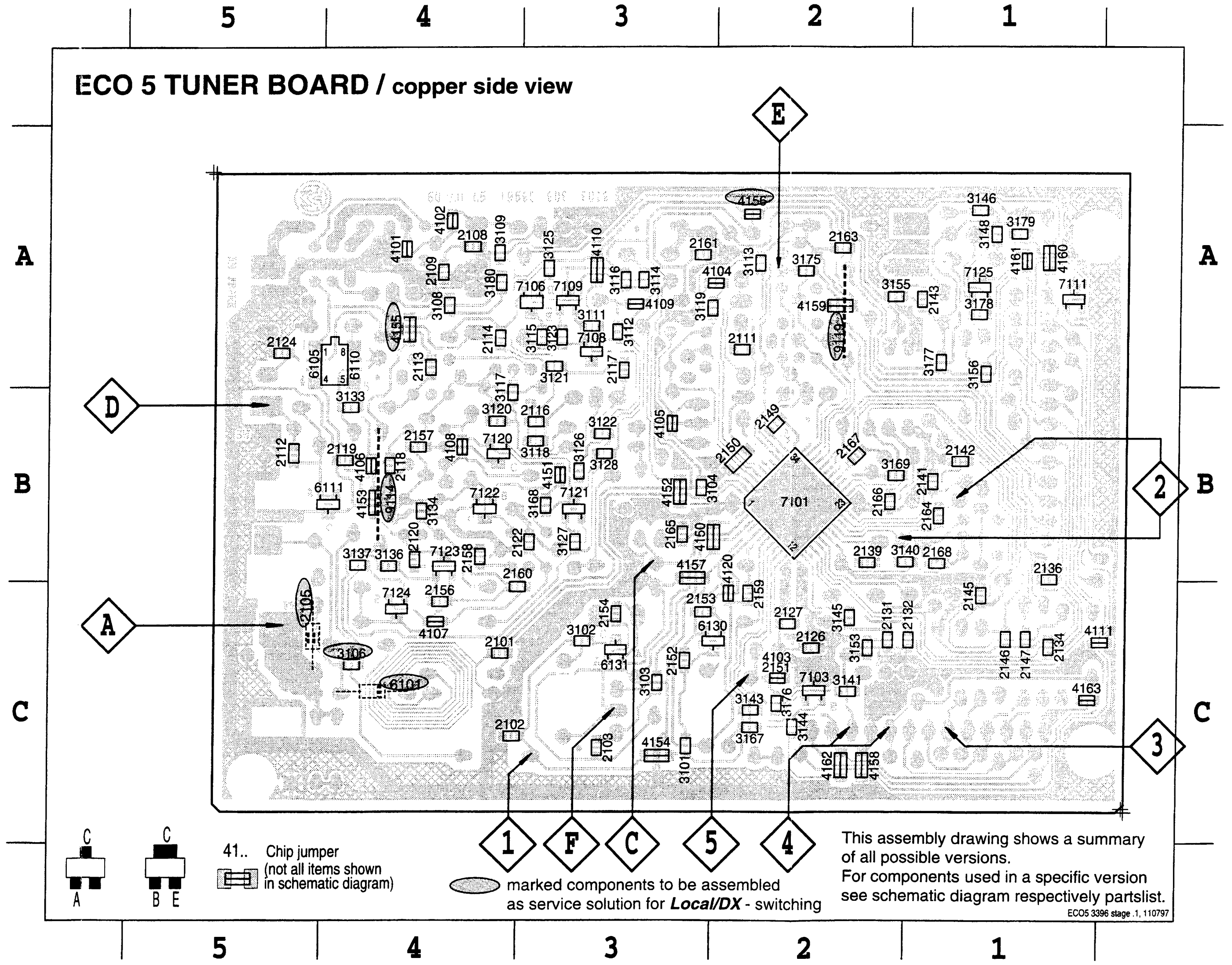
ECO 5 TUNER BOARD / component side view

1
2
3
4
5
A
B
C
FM 75 OHM
FM 300 OHM
SW
AM FRAME AERIAL
VCC2
VCC
RIGHT
GND
LEFT
ENABLE
DATA
STEREO
CLOCK
DATA
ENABLE
MPX
GND
FM-RF
FM-OSC
VCO
DISCRIMI-NATOR
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
MW-RF
LW-RF
AM-IF1
AM-AFC
AM-IF2
SEARCH SENS.
AM-IF
GND
+FM
R-FM
L-FM
L out
R out
VCOkill
STSIG
STEREO
V+
Connector for AM - stereo Module
Voltage multiplier board
2SA...
BC...
ECO5 3396 stage .1, 110797

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for ***Local/DX*** - switching

2101 C4	2118 B4	2139 B2	2153 C3	2166 B2	3112 A3	3123 A3	3143 C2	3175 A2	4106 B4	4154 C3	6110 A4	7121 B3
2102 C4	2119 B4	2141 B1	2154 C3	2167 B2	3113 A2	3125 A3	3144 C2	3176 C2	4107 C4	4155 A4	6111 B4	7122 B4
2103 C3	2120 B4	2142 B1	2156 C4	2168 B1	3114 A3	3126 B3	3145 C2	3177 A1	4108 B4	4156 A2	6130 C2	7123 B4
2108 A4	2122 B3	2143 A1	2157 B4	3101 C3	3115 A3	3127 B3	3146 A1	3178 A1	4109 A3	4157 B3	6131 C3	7124 C4
2109 A4	2124 A5	2145 C1	2158 B4	3102 C3	3116 A3	3128 B3	3148 A1	3179 A1	4110 A3	4158 C2	7101 B2	7125 A1
2111 A2	2126 C2	2146 C1	2159 C2	3103 C3	3117 B4	3133 B4	3153 C2	3180 A4	4111 C1	4159 A2	7103 C2	
2112 B5	2127 C2	2147 C1	2160 C4	3104 B3	3118 B3	3134 B4	3155 A2	4101 A4	4120 C2	4160 A1	7106 A3	
2113 A4	2131 C2	2149 B2	2161 A3	3106 C4	3119 A3	3136 B4	3156 A1	4102 A4	4150 B2	4161 A1	7108 A3	
2114 A4	2132 C1	2150 B2	2163 A2	3108 A4	3120 B4	3137 B4	3167 C2	4103 C2	4151 B3	4162 C1	7109 A3	
2116 B3	2134 C1	2151 C2	2164 B1	3109 A4	3121 A3	3140 B2	3168 B3	4104 A2	4152 B3	4163 C1	7111 A1	
2117 A3	2136 B1	2152 C3	2165 B3	3111 A3	3122 B3	3141 C2	3169 B2	4105 B3	4153 B4	6105 A4	7120 B4	



ECO 5 TUNER BOARD / copper side view

5
4
3
2
1
A
B
C
E
D
7101
41..
Chip jumper
(not all items shown in schematic diagram)
ECO5 3396 stage .1, 110797

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for ***Local/DX*** - switching

TUNER ADJ

Waverange
VARICAP ALIG
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108M
MW FM/AM-version, 10kHz g 530 - 1700kHz
FM/MW-version, 9kHz gri 531 - 1602kHz
LW 153 - 279kHz
MW FM/MW/LW- version, 9kH 531 - 1602kHz
FM IF
FM
FM RF
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108M
VCO
FM
AM IF
MW
AM AFC **MW**
AM RF 3)
MW 4) FM/MW/LW- and FM/MW-vers (9kHz grid) 531 - 1602kHz
LW
MW FM/AM-version, 10kHz gri 530 - 1700kHz

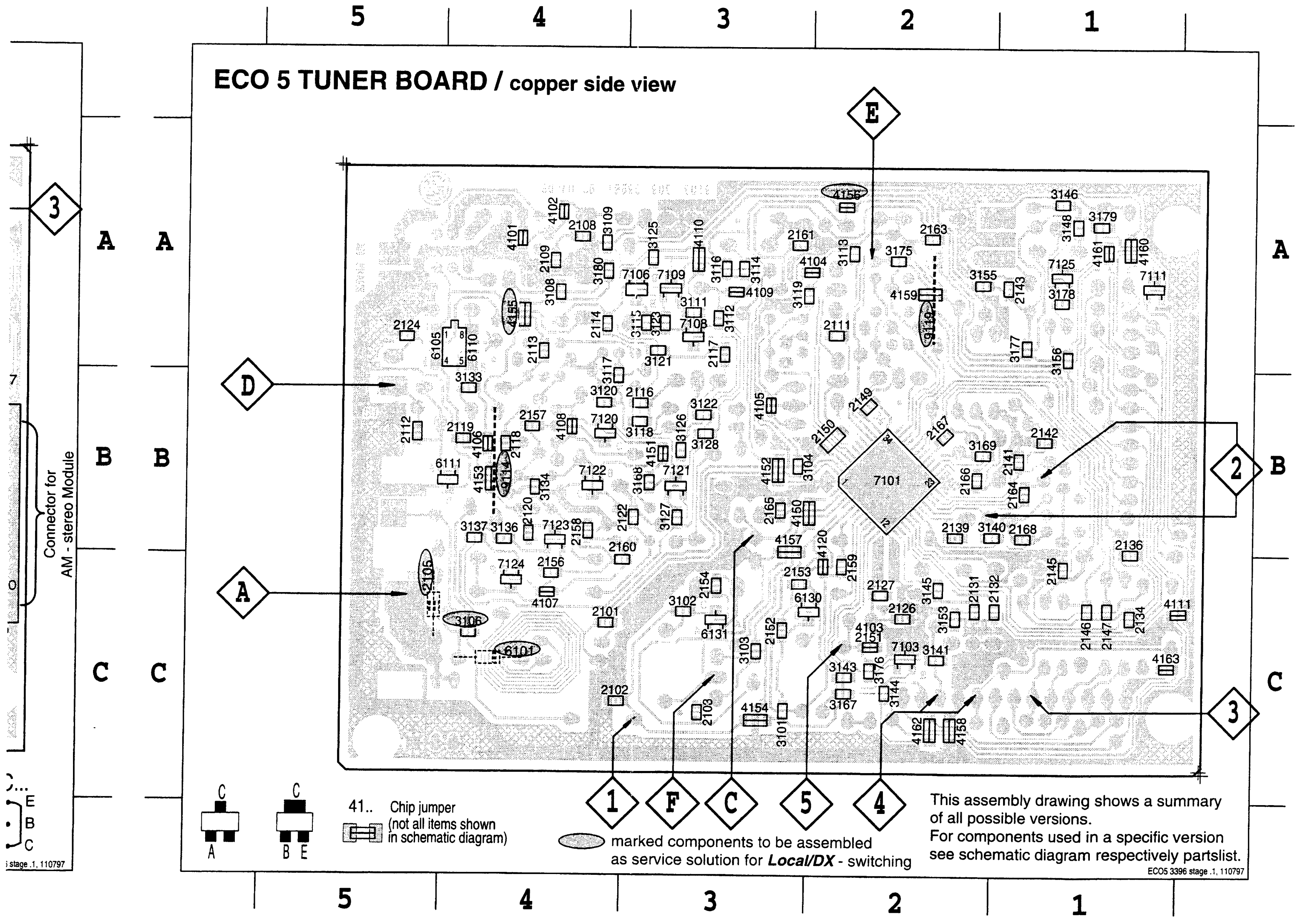
Use service test progran

1) If sensitivity of frequer
(input signal: stereo le

3) For AM RF adjustmen

↕ Repeat

2101	C4
2102	C4
2103	C3
2108	A4
2109	A4
2111	A2
2112	B5
2113	A4
2114	A4
2116	B3
2117	A3
2118	B4
2119	B4
2120	B4
2122	B3
2124	A5
2126	C2
2127	C2
2131	C2
2132	C1
2134	C1
2136	B1
2139	B2
2141	B1
2142	B1
2143	A1
2145	C1
2146	C1
2147	C1
2149	B2
2150	B2
2151	C2
2152	C3
2153	C3
2154	C3
2156	C4
2157	B4
2158	B4
2159	C2
2160	C4
2161	A3
2163	A2
2164	B1
2165	B3
2166	B2
2167	B2
2168	B 1
3101	C3
3102	C3
3103	C3
3104	B3
3106	C4
3108	A4
3109	A4
3111	A3
3112	A3
3113	A2
3114	A3
3115	A3
3116	A3
3117	B4
3118	B3
3119	A3
3120	B4
3121	A3
3122	B3
3123	A3
3125	A3
3126	B3
3127	B3
3128	B3
3133	B4
3134	B4
3136	B4
3137	B4
3140	B2
3141	C2
3143	C2
3144	C2
3145	C2
3146	A1
3148	A1
3153	C2
3155	A2
3156	A1
3167	C2
3168	B3
3169	B2
3175	A2
3176	C2
3177	A1
3178	A1
3179	A1
3180	A4
4101	A4
4102	A4
4103	C2
4104	A2
4105	B3
4106	B4
4107	C4
4108	B4
4109	A3
4110	A3
4111	C1
4120	C2
4150	B2
4151	B3
4152	B3
4153	B4
4154	C3
4155	A4
4156	A2
4157	B3
4158	C2
4159	A2
4160	A1
4161	A1
4162	C1
4163	C1
6105	A4
6110	A4
6111	B4
6130	C2
6131	C3
7101	B2
7103	C2
7106	A3
7108	A3
7109	A3
7111	A1
7120	B4
7121	B3
7122	B4
7123	B4
7124	C4
7125	A1


5
4
3
2
1
A
B
C
E
D
A
F
C
1
2
3
4
5
Connector for AM - stereo Module
7101
6101
6110
6105
6111
6130
6131
2102
2101
2106
2112
2119
2124
2136
2141
2142
2145
2163
2166
3101
3106
3133
3142
4111
4154
4156
4157
4163
7111
7125
C
B
E
A
B E
stage .1, 110797
ECO5 3396 stage .1, 110797

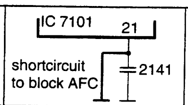
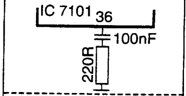
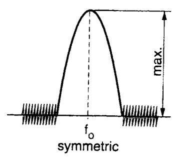
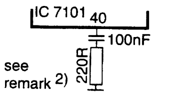
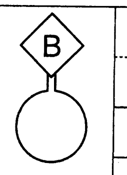
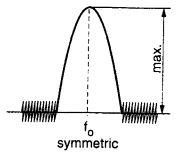
ECO 5 TUNER BOARD / copper side view

41.. Chip jumper (not all items shown in schematic diagram)

marked components to be assembled as service solution for ***Local/DX*** - switching

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

TUNER ADJUSTMENT TABLE (**ECO5** FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	1	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM IF						
FM	10.7MHz, 50mV continuous wave	F	 IC 7101 21 shortcircuit to block AFC 2141	5119	2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	A	108MHz	2155	4	MAX ↕
	87.5MHz (65.81MHz)	mod=1kHz Δf=±22.5kHz	87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz 1)
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	C Δf=±15kHz V_{RF} = 3mV	 IC 7101 36 100nF 220R	5111	4	 max. f_o symmetric
			 IC 7101 40 100nF 220R see remark 2)	5112		
AM AFC **MW**		C continuous wave V_{RF} = 10mV		5114	2	0 ± 2 mV DC
AM RF 3)						
MW 4) FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz		1494kHz	2106	4	 max. f_o symmetric ↕
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz	Δf = ±30kHz V_{RF} as low as possible	1500kHz	2106		↕
	560kHz		560kHz	5102		

ECO5, discr. coil, 090797

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

1) If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

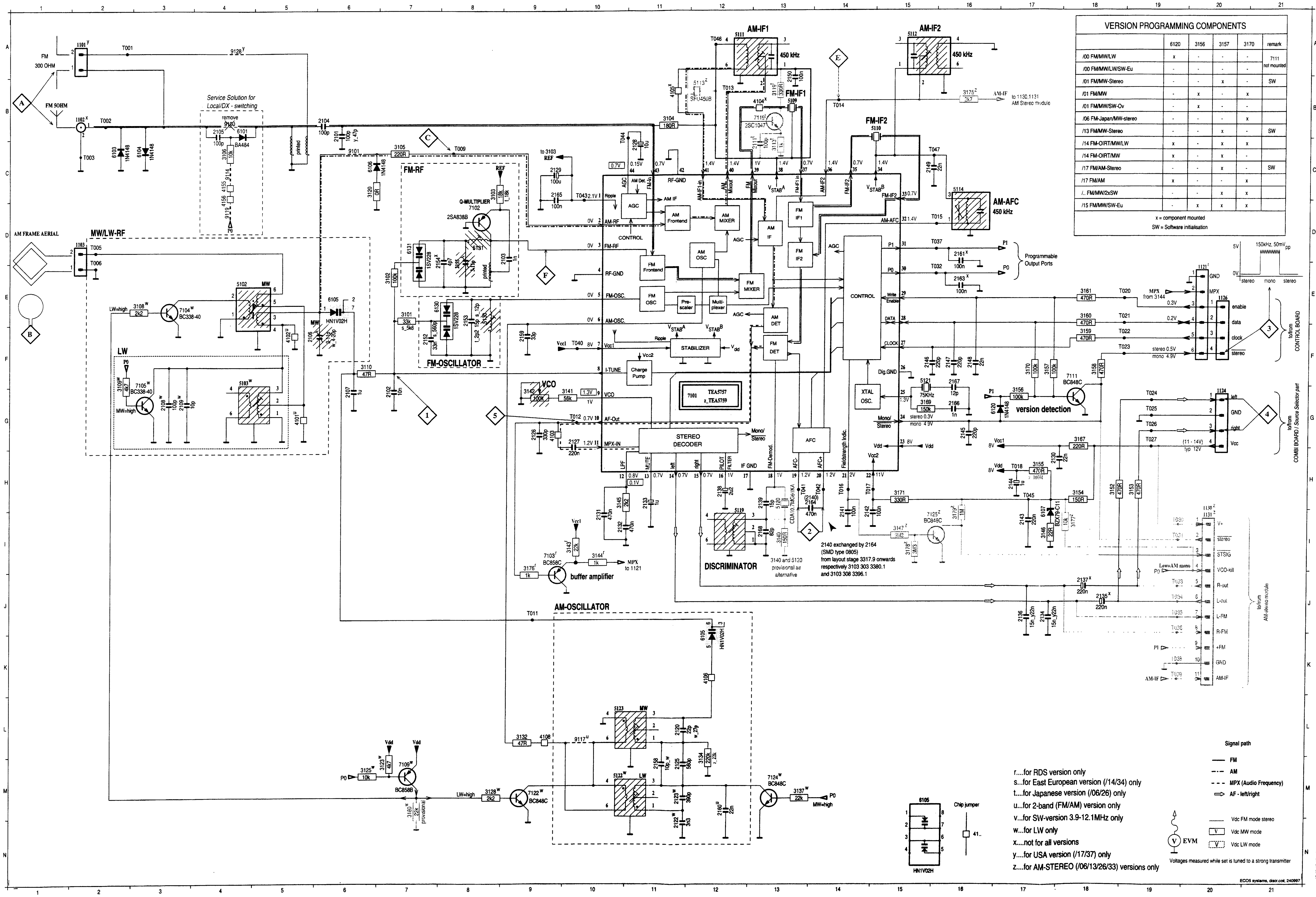
2) RC network serves for damping the IF-filter while adjusting the other one.

3) For AM RF adjustments the original frame antenna has to be used !

4) MW has to be aligned before LW.

↕ Repeat

TUNER BOARD ECO5 / Systems


AM-IF1
AM-IF2
FM-IF1
FM-IF2
AM-AFC
450 kHz
FM-RF
FM-OSCILLATOR
MW/LW-RF
LW
VCO
AM-OSCILLATOR
DISCRIMINATOR
STEREO DECODER
CONTROL
STABILIZER
Charge Pump
XTAL OSC.
AGC
AM Frontend
AM MIXER
FM Frontend
FM MIXER
FM OSC
Pre-scaler
Multi-plexer
AM DET
FM DET
AFC
7101 TEA5757 z_TEA5759
Q-MULTIPLIER 7102 2SA838B
buffer amplifier 7103 BC858C
version detection
FM 300 OHM
FM 50OHM
AM FRAME AERIAL
Service Solution for Local/DX - switching
Programmable Output Ports
to/from CONTROL BOARD
to/from COMBI BOARD / Source Selector part
to/from AM-stereo module
150kHz, 50mVpp
stereo mono stereo
2140 exchanged by 2164 (SMD type 0805) from layout stage 3317.9 onwards respectively 3103 303 3380.1 and 3103 308 3396.1
3140 and 5120 provisional as alternative
HN1V02H
Chip jumper
ECO5 systems, discr.coil, 240997

VERSION PROGRAMMING COMPONENTS

	6120	3156	3157	3170	remark
/00 FM/MW/LW	x	-	-	-	7111 not mounted
/00 FM/MW/LW/SW-Eu	-	-	-	-	
/01 FM/MW-Stereo	-	-	x	-	SW
/01 FM/MW	-	x	-	x	
/01 FM/MW/SW-Ov	-	x	-	-	
/06 FM-Japan/MW-stereo	-	-	-	x	
/13 FM/MW-Stereo	-	-	x	-	SW
/14 FM-OIRT/MW/LW	x	-	x	x	
/14 FM-OIRT/MW	x	-	x	-	
/17 FM/AM-Stereo	-	-	x	-	SW
/17 FM/AM	x	-	-	x	
/.. FM/MW/2xSW	-	-	x	x	
/15 FM/MW/SW-Eu	-	x	x	x	

x = component mounted
SW = Software initialisation

r....for RDS version only
s...for East European version (/14/34) only
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) versions only

Signal path

—	FM
-·-	AM
- - -	MPX (Audio Frequency)
⇨	AF - left/right

....	Vdc FM mode stereo
V	Vdc MW mode
V	Vdc LW mode

EVM

Voltages measured while set is tuned to a strong transmitter

1101	A 1
1102	B 2
1103	D 2
1121	E20
1124	G20
1126	E20
1130	I20
1131	I20
2101	C 6
2102	G 7
2103	D 9
2104	B 6
2106	F 5
2107	G 6
2108	G 3
2109	G 3
2111	C13
2120	L11
2122	N11
2123	M11
2125	M11
2126	G 9
2127	G10
2128	C11
2129	C 9
2130	H17
2131	I10
2132	I10
2133	H11
2134	J17
2135	J18
2136	J17
2137	J18
2138	H12
2139	H13
2140	H14
2141	H14
2142	H14
2143	I17
2144	H17
2145	G16
2146	F15
2147	F16
2148	F16
2149	C15
2150	B13
2152	F 7
2153	E 8
2154	E 7
2155	D 8
2158	M11
2159	F 9
2160	M12
2161	D16
2163	E16
2164	H14
2165	C 9
2166	G16
2167	F16
2168	I 13
3101	E 7
3102	E 7
3103	C 8
3104	B11
3105	C 7
3108	E 3
3109	F 2
3110	F 6
3113	C13
3119	B13
3120	C 6
3123	M 7
3125	M 6
3128	M 8
3132	L 9
3134	M12
3137	M13
3140	I13
3141	G10
3142	G 9
3143	I10
3144	I10
3145	H10
3146	I17
3147	I15
3152	H18
3153	H19
3154	H18
3155	H17
3156	G17
3157	F17
3158	F18
3159	F18
3160	E18
3161	E18
3167	G18
3169	G15
3170	F17
3171	H15
3175	B16
3176	J 9
3177	I18
3178	I15
3179	I16
3180	M7
4101	G 5
4102	F 5
4103	G 9
4104	B13
4105	B11
4106	K12
4108	L 9
5102	E 4
5103	F 4
5109	B13
5110	B14
5111	A13
5112	A15
5113	B12
5114	C16
5119	I 12
5120	H13
5121	F15
5122	M11
5123	L11
5130	E 8
5131	D 8
6103	C 2
6104	C 3
6105	K12
6105	E 6
6106	C 6
6107	H17
6120	G16
6130	E 7
6131	D 7
7101	G11
7102	D 8
7103	I 9
7104	E 3
7105	F 2
7109	M 7
7111	F18
7119	B13
7122	M 9
7124	M13
7125	I16
9100	B 4
9101	C 6
9117	L10
9128	A 4

MISCELLANEOUS

1101	4822 267 31505	Antenna Socket 300R	
1102	4822 267 10283	Antenna Socket Coax IEC 75R	

CAPACITORS

2101	5322 122 32531	100pF 5% 50V	
2101	4822 126 13692	47pF 1% 63V	for USA
2102	4822 122 33177	10nF 20% 50V	
2103	5322 122 34123	1nF 10% 50V	
2104	4822 122 33195	100pF 10% 50V	
2106	4822 125 50355	Trimmer 4-20pF	for LW version
2106	4822 125 60101	Trimmer 3-11pF 100V	
2107	4822 121 51319	1µF 10% 63V	
2108	5322 122 32531	100pF 5% 50V	for LW version
2109	5322 122 32448	10pF 5% 50V	for LW version
2120	4822 126 13691	27pF 1% 63V	for LW version
2120	5322 122 32658	22pF 5% 50V	
2122	4822 122 33891	3,3nF 10% 63V	for LW version
2125	4822 121 51381	560pF 5% 400V	
2126	5322 122 31863	330pF 5% 50V	
2127	4822 126 13473	220nF +80/-20% 50V	
2128	4822 124 41579	10µF 20% 50V	
2129	4822 124 41584	100µF 20% 10V	
2130	4822 126 11585	22nF+80/- 20% 25V	
2131	4822 122 33325	470nF 16V	
2132	4822 122 33325	470nF 16V	
2131	4822 126 13482	470nF +80/- 20% 16V	
2132	4822 126 13482	470nF +80/- 20% 16V	
2133	4822 124 40242	1µF 20% 63V	
2134	4822 126 13188	15nF 5% 63V	
2134	5322 122 32654	22nF 10% 63V	for USA
2135	4822 124 40746	0,22µF 20% 63V	
2136	4822 126 13188	15nF 5% 63V	
2136	5322 122 32654	22nF 10% 63V	for USA
2137	4822 124 40746	0,22µF 20% 63V	
2138	4822 124 41576	2,2µF 20% 50V	
2139	4822 126 14236	50V 15pF 5%	
2140	4822 121 51252	470nF 5% 63V	
2141	4822 126 10002	100nF 20% 25V	
2142	4822 126 10002	100nF 20% 25V	
2143	4822 126 13473	220nF +80/-20% 50V	
2144	4822 124 40242	1µF 20% 63V	
2145	4822 122 33575	220pF 5% 50V	
2146	4822 122 33575	220pF 5% 50V	
2147	4822 122 33575	220pF 5% 50V	
2148	4822 126 11585	22nF+80/- 20% 25V	
2149	5322 122 32654	22nF 10% 63V	
2150	4822 122 31947	100nF 20% 63V	
2152	5322 116 80853	560pF 5% 63V	for East. Europe
2152	4822 126 12105	33nF 5% 63V	
2153	4822 122 32139	12pF 2% 63V	for East. Europe
2153	4822 122 32504	15pF 2% 63V	
2155	4822 125 60101	Trimmer 3-11pF 100V	
2158	5322 122 32448	10pF 5% 50V	for LW version
2159	5322 122 32659	33pF 5% 50V	
2160	5322 122 32654	22nF 10% 63V	
2161	4822 126 10002	100nF 20% 25V	
2163	4822 126 10002	100nF 20% 25V	
2164	4822 126 13482	470nF +80/- 20% 16V	
2165	4822 126 10002	100nF 20% 25V	
2166	5322 122 34123	1nF 10% 50V	
2167	4822 122 32139	12pF 2% 63V	
2168	4822 126 13695	82pF 1% 63V	

RESISTORS

3101	4822 051 20562	5k6 5% 0,1W	for East. Europe
3101	4822 051 20333	33k 5% 0,1W	
3102	4822 051 20104	100k 5% 0,1W	
3103	4822 117 10965	18k 1% 0,1W	
3104	4822 117 11448	180R 1% 0,1W	
3105	4822 116 83872	220R 5% 0,5W	
3108	4822 117 11449	2k2 1% 0,1W	for LW version
3109	4822 051 20472	4k7 5% 0,1W	for LW version
3110	4822 116 52195	47R 5% 0,5W	
3120	4822 051 20008	0R Jumper 0805	
3123	4822 051 20472	4k7 5% 0,1W	for LW version
3125	4822 117 10833	10k 1% 0,1W	for LW version
3128	4822 117 11449	2k2 1% 0,1W	for LW version
3132	4822 116 52195	47R 5% 0,5W	
3134	4822 051 20224	220k 5% 0,1W	
3137	4822 051 20223	22k 5% 0,1W	for LW version
3140	4822 051 20008	0R Jumper 0805	
		5120=CDA10.7MG40K	
3140	4822 117 10353	150R 1% 0,1W	
		5120=CDA10.7MG61KA	
3141	4822 051 20563	56k 5% 0,1W	
3142	4822 100 11163	Trimmer 100k 30% 0,1W	
3143	4822 051 20223	22k 5% 0,1W	for RDS version
3144	4822 051 10102	1k 2% 0,25W	for RDS version
3145	4822 117 11449	2k2 1% 0,1W	
3146	4822 051 20229	22R 5% 0,1W	
3152	4822 116 83883	470R 5% 0,5W	
3153	4822 051 20471	470R 5% 0,1W	
3154	4822 116 83868	150R 5% 0,5W	
3155	4822 051 20471	470R 5% 0,1W	
3156	4822 051 20104	100k 5% 0,1W	for /21/30/33 only
3157	4822 116 52234	100k 5% 0,5W	for East. Europe
3158	4822 116 83883	470R 5% 0,5W	
3159	4822 116 83883	470R 5% 0,5W	
3160	4822 116 83883	470R 5% 0,5W	
3161	4822 116 83883	470R 5% 0,5W	
3167	4822 117 11503	220R 1% 0.1W	
3169	4822 051 20154	150k 5% 0,1W	
3170	4822 116 52234	100k 5% 0,5W	
3171	4822 116 52219	330R 5% 0,5W	
3176	4822 051 10102	1k 2% 0,25W	for RDS version
4101	4822 051 20008	0R Jumper 0805	for 2-Band only
4102	4822 051 20008	0R Jumper 0805	for 2-Band only
4103	4822 051 20008	0R Jumper 0805	
4104	4822 051 20008	0R Jumper 0805	
4105	4822 051 20008	0R Jumper 0805	
4106	4822 051 20008	0R Jumper 0805	
4108	4822 051 20008	0R Jumper 0805	
4111	4822 051 20008	0R Jumper 0805	
4120	4822 051 20008	0R Jumper 0805	
4150	4822 051 10008	0R Jumper 1206	
4151	4822 051 20008	0R Jumper 0805	
4152	4822 051 10008	0R Jumper 1206	
4153	4822 051 10008	0R Jumper 1206	
4154	4822 051 10008	0R Jumper 1206	
4155	4822 051 10008	0R Jumper 1206	
4156	4822 051 20008	0R Jumper 0805	
4157	4822 051 10008	0R Jumper 1206	
4158	4822 051 10008	0R Jumper 1206	
4159	4822 051 10008	0R Jumper 1206	
4162	4822 051 10008	0R Jumper 1206	

COILS & FILTERS

5102	4822 157 71634	MW RF Coil	
5103	4822 157 71635	LW RF Coil	for LW version
5109	4822 242 70665	Ceram Filter 10,7MHz	
5110	4822 242 70665	Ceram Filter 10,7MHz	
5111	4822 158 60511	AM-IF Filter 450kHz	
5112	4822 157 70302	AM-IF Filter 450kHz	
5114	4822 157 70302	AM-IF Filter 450kHz	
5119	4822 157 11443	Discriminator 10,7MHz	
5120	4822 242 82065	Cer. Disc. 10,7MG40K	
5120	4822 242 10251	Cer. Disc.10,7MG61KA-TF21	
5121	4822 242 10261	Quartz 75kHz	
5122	4822 157 60517	Osc. Coil LW	for LW version
5123	4822 157 60517	Osc. Coil MW	
5130	4822 156 30947	RF-Coil 1.5T	
5131	4822 156 30947	RF-Coil 1.5T	

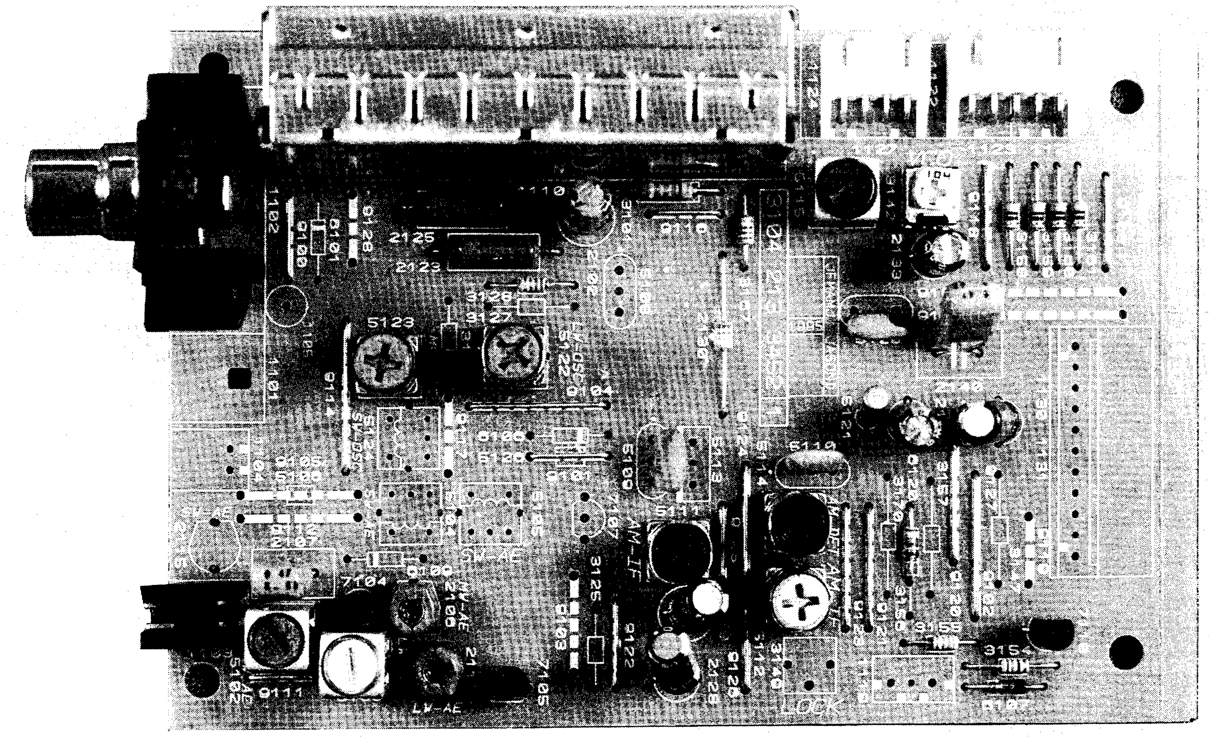
DIODES

6103	4822 130 30621	1N4148	
6104	4822 130 30621	1N4148	
6105	4822 130 83075	HN1V02H-B	
6106	4822 130 30621	1N4148	
6107	4822 130 34488	BZX79-B11	
6120	4822 130 30621	1N4148	not for /21/30/33
6130	4822 130 82833	1SV228	
6131	4822 130 82833	1SV228	

TRANSISTORS & INTEGRATED CIRCUITS

7101	4822 209 90924	TEA5757H/V1	
7102	4822 130 60093	2SA838B	
7103	4822 130 42513	BC858C	for RDS version
7104	5322 130 44779	BC338-40	for LW version
7105	5322 130 44779	BC338-40	for LW version
7109	5322 130 41983	BC858B	for LW version
7111	5322 130 42136	BC848C	
7122	5322 130 42136	BC848C	for LW version
7124	5322 130 42136	BC848C	for LW version

Note: Only the parts mentioned in this list are normal service spare parts.



TUNER 95 BOARD

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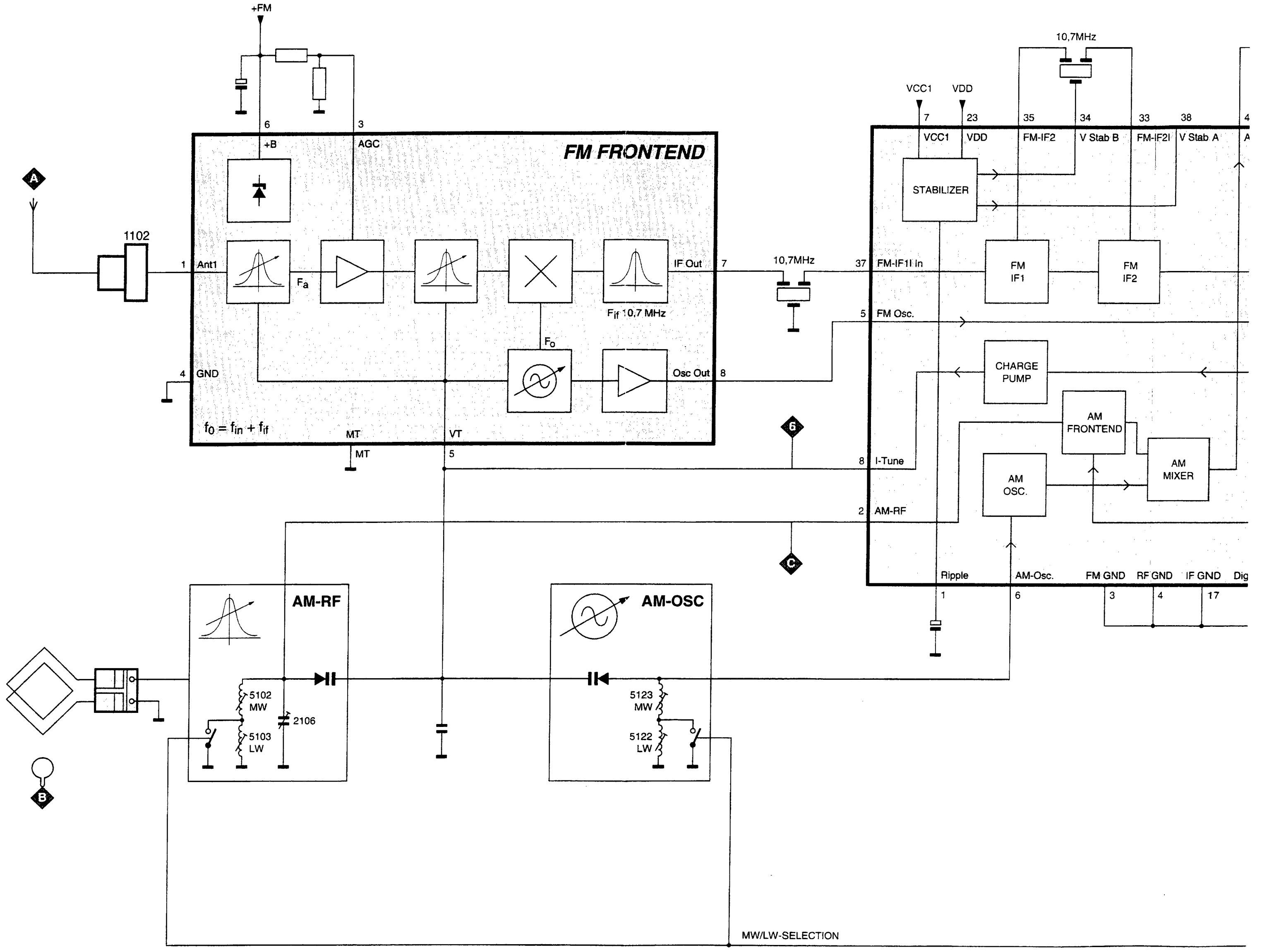
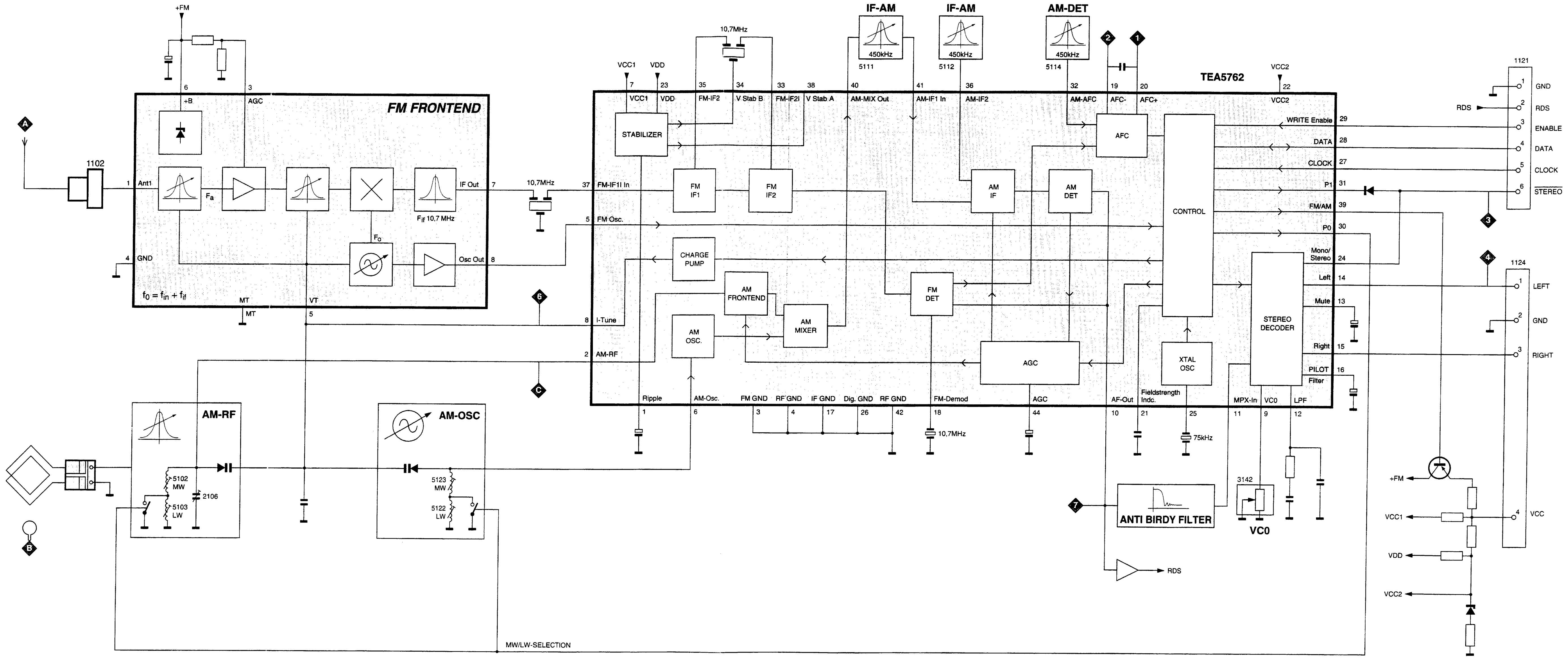
Partslist 7D-4

BLOCKDIAGRAM

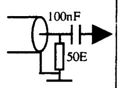


+FM
6
3
+B
AGC
FM FRONTEND
1102
1
Ant1
Fa
IF Out
7
Fif 10,7 MHz
Fo
4
GND
Osc Out
8
f0 = fin + fif
MT
VT
5
10,7MHz
10,7MHz
VCC1
VDD
7
23
35
34
33
38
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
STABILIZER
37
FM-IF1I In
FM IF1
FM IF2
5
FM Osc.
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
8
I-Tune
2
AM-RF
Ripple
AM-Osc.
FM GND
RF GND
IF GND
1
6
3
4
17
AM-RF
5102 MW
2106
5103 LW
AM-OSC
5123 MW
5122 LW
MW/LW-SELECTION
A
B
C
6

BLOCKDIAGRAM


+FM
FM FRONTEND
+B
AGC
Ant1
GND
Fa
Fo
Fif 10,7 MHz
IF Out
Osc Out
f0 = fin + fif
MT
VT
1102
A
B
C
AM-RF
5102 MW
5103 LW
2106
AM-OSC
5123 MW
5122 LW
MW/LW-SELECTION
10,7MHz
IF-AM
450kHz
5111
5112
AM-DET
5114
TEA5762
VCC1
VDD
VCC2
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
STABILIZER
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
AGC
XTAL OSC
STEREO DECODER
FM-IF1I In
FM Osc.
I-Tune
AM-RF
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VC0
LPF
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/ Stereo
Left
Mute
Right
PILOT Filter
75kHz
3142
VC0
ANTI BIRDY FILTER
RDS
1121
GND
RDS
ENABLE
DATA
CLOCK
STEREO
1124
LEFT
GND
RIGHT
VCC
+FM
VCC1
VDD
VCC2
1
2
3
4
6
7

TUNER 95 bis Adjustment Table (FM, MW, LW with Frame antenna)

Waverange	Input frequency	Input	Set tuned to	Adjust	Output	Scope / Voltmeter
VARICAP ALIGNMENT						
FM (50)			108 MHz	check	6	7 ... 9V
87.5 - 108 MHz			87.5 MHz	check		1.3 ... 2V
MW (9)			1602 kHz	5123		8.3V ± 0.2V
531 - 1602 kHz			531 kHz	check		1V ± 0.4V
LW (3)			279 kHz	5122		8.3V ± 0.2V
153 - 279 kHz			153 kHz	check		1V ± 0.4V
FM – DETECTION						
FM	98 MHz 1mV continuous wave *short pin 21 (IC7101) to ground*	A	98 MHz	5107	1 2	0mV ± 3mV
FM – VCO						
FM	98 MHz 1 mV continuous wave	A	98 MHz	3142	3	152kHz ± 1 kHz
DISTORTION						
FM	• 98 MHz 1 mV 90 % L + 9 % pilot mod = 1kHz	A	98MHz	mixcoil inside Tuner 1110	4	Distortion minimum
AM – IF						
MW	450kHz Δf = 10kHz Low as possible Swept signal	 C	MW	5111	7	symmetrical and max. height ↕
				5112		
	450kHz continuous wave			5114	1 2	0mV ± 2mV
AM - RF						
MW	558kHz Mod = 1kHz 30 % AM 1494 kHz	B	558kHz	5102	7	MAX ↕
			1494kHz	2106		
LW	198kHz mod = 1kHz 30 % AM	*	198kHz	5103		MAX

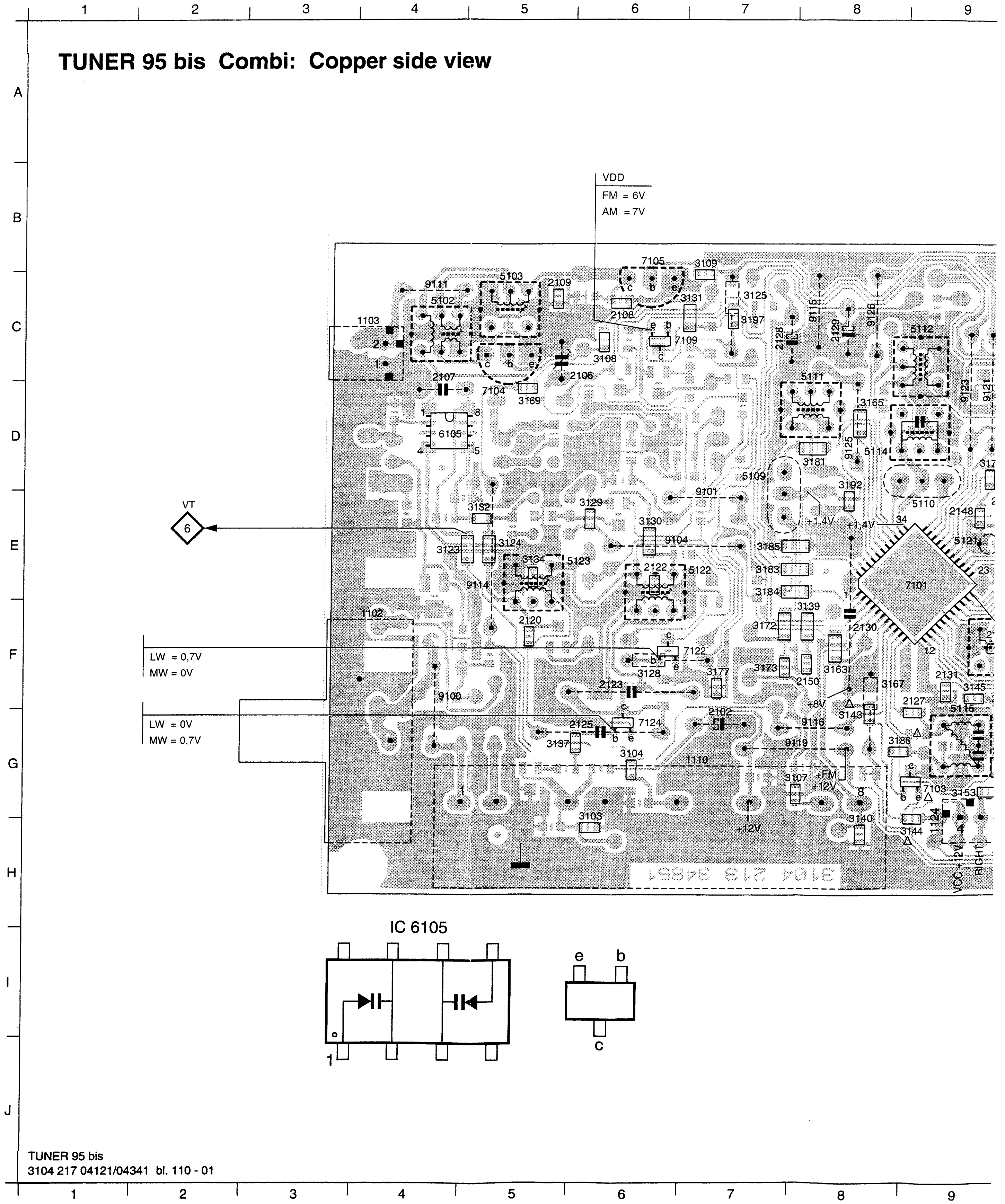
adjtable for 3104 217 04121/04341

* Signal send via a frame antenna
(..) = tuning grid in kHz

↕ repeat

1102	F4	2107	C4	2128	C7	2136	G10	2145	G11	2161	E9	3124	E5	3137	G5	3145	F9	3158	G11	3167	F8	3183	E7	5103	
1103	C3	2108	C6	2129	C8	2137	E11	2147	G11	2162	C11	3125	C7	3138	D9	3146	B10	3159	G11	3169	D5	3184	E7	5107	
1110	G7	2109	C5	2130	F8	2138	E10	2148	E9	3103	H6	3128	F6	3139	F8	3150	C11	3160	G11	3171	D11	3185	E7	5109	
1121	H11	2120	F5	2131	F9	2140	F10	2150	F8	3104	G6	3129	E6	3140	H8	3151	C10	3161	G11	3172	F7	3186	G8	5110	
1124	H9	2122	E6	2132	F9	2141	E10	2151	F9	3107	G7	3130	E6	3141	G9	3152	G9	3162	D9	3173	F7	3188	G11	5111	
1126	G10	2123	F6	2133	F10	2142	E9	2152	F9	3108	C6	3131	C6	3142	G10	3153	G9	3163	F8	3176	D9	3192	D8	5112	
2102	G7	2125	G5	2134	G10	2143	C10	2158	D10	3109	B7	3132	E5	3143	G8	3154	C10	3164	C11	3177	F7	3197	C7	5114	
2106	C5	2127	F9	2135	G11	2144	E10	2160	E9	3123	E4	3134	E5	3144	H8	3155	C10	3165	D8	3181	D8	5102	C4	5115	

TUNER 95 bis Combi: Copper side view


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
G
H
I
J
VDD
FM = 6V
AM = 7V
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
7101
6105
7105
7109
7122
7124
7104
7103
1102
1103
1110
5102
5103
5109
5110
5111
5112
5114
5115
5121
5122
5123
+1,4V
+8V
+12V
+FM
3104 213 3485
IC 6105
e
b
c
1
TUNER 95 bis
3104 217 04121/04341 bl. 110 - 01

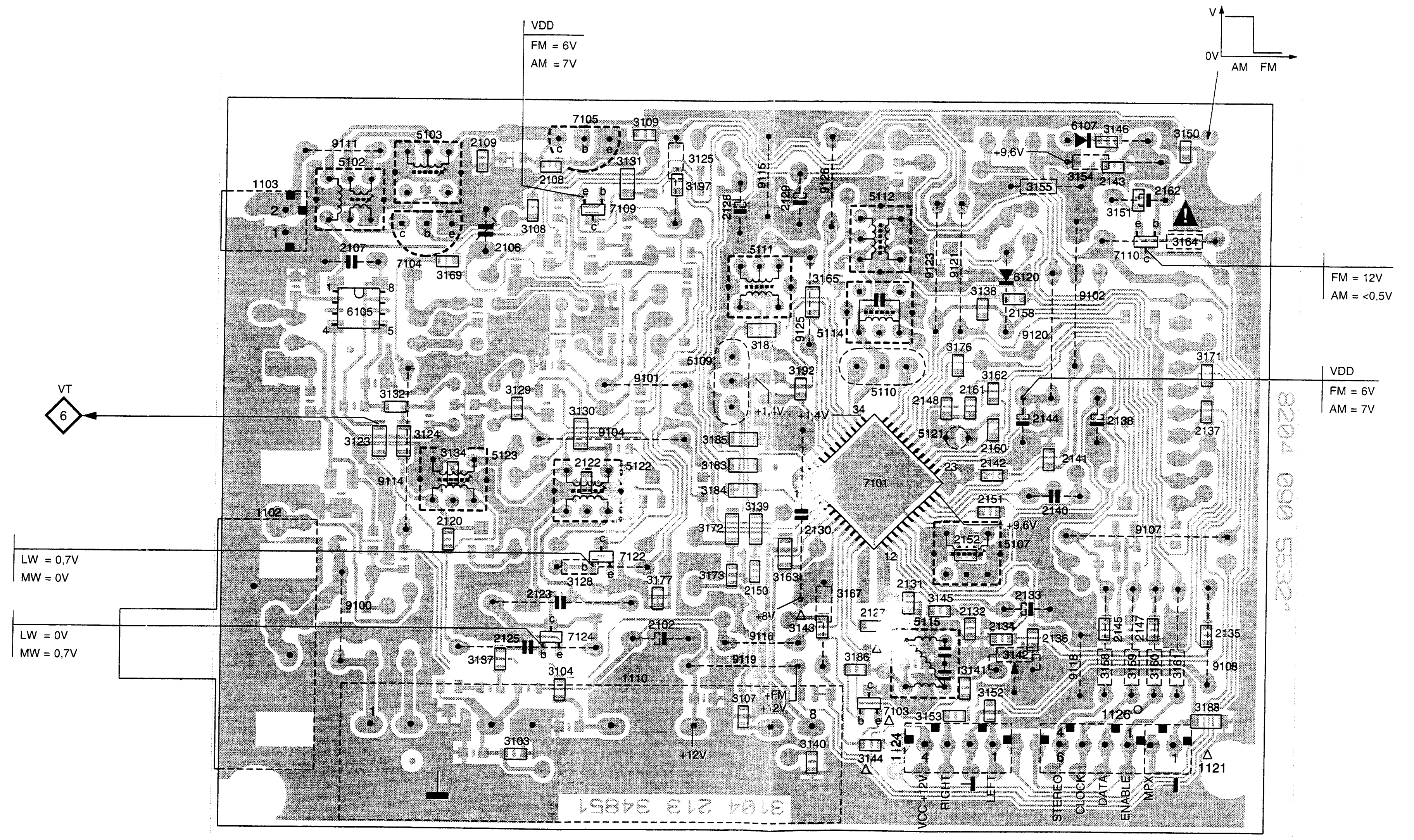
ter

Iz

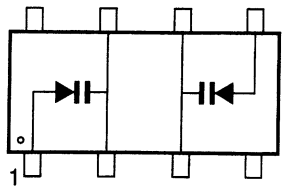
d

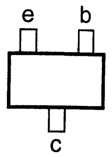
1102	F4	2107	C4	2128	C7	2136	G10	2145	G11	2161	E9	3124	E5	3137	G5	3145	F9	3158	G11	3167	F8	3183	E7	5103	C5	5121	E9	7104	D5	9102	D10	9118	G10
1103	C3	2108	C6	2129	C8	2137	E11	2147	G11	2162	C11	3125	C7	3138	D9	3146	B10	3159	G11	3169	D5	3184	E7	5107	F10	5122	E7	7105	B6	9104	E6	9119	G7
1110	G7	2109	C5	2130	F8	2138	E10	2148	E9	3103	H6	3128	F6	3139	F8	3150	C11	3160	G11	3171	D11	3185	E7	5109	D7	5123	E5	7109	C6	9107	F11	9120	D10
1121	H11	2120	F5	2131	F9	2140	F10	2150	F8	3104	G6	3129	E6	3140	H8	3151	C10	3161	G11	3172	F7	3186	G8	5110	E9	6105	D4	7110	D11	9108	G11	9121	D9
1124	H9	2122	E6	2132	F9	2141	E10	2151	F9	3107	G7	3130	E6	3141	G9	3152	G9	3162	D9	3173	F7	3188	G11	5111	C8	6107	B10	7122	F7	9111	C4	9123	D9
1126	G10	2123	F6	2133	F10	2142	E9	2152	F9	3108	C6	3131	C6	3142	G10	3153	G9	3163	F8	3176	D9	3192	D8	5112	C9	6120	D10	7124	G6	9114	E5	9125	D8
2102	G7	2125	G5	2134	G10	2143	C10	2158	D10	3109	B7	3132	E5	3143	G8	3154	C10	3164	C11	3177	F7	3197	C7	5114	D8	7101	E9	9100	F4	9115	C8	9126	C8
2106	C5	2127	F9	2135	G11	2144	E10	2160	E9	3123	E4	3134	E5	3144	H8	3155	C10	3165	D8	3181	D8	5102	C4	5115	G9	7103	G9	9101	E7	9116	G8		

TUNER 95 bis Combi: Copper side view


VDD
FM = 6V
AM = 7V
V
0V
AM FM
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
FM = 12V
AM = <0,5V
VDD
FM = 6V
AM = 7V
6105
7101
7104
7105
7109
7110
7122
7124
6107
6120
5102
5103
5107
5110
5111
5112
5114
5115
5121
5122
5123
1102
1103
1110
1124
1126
1121
9100
9101
9102
9104
9107
9108
9111
9114
9115
9116
9118
9119
9120
9121
9123
9125
9126
+9,6V
+8V
+1,1V
+1,4V
+12V
+FM
+12V
VCC 12V
RIGHT
LEFT
STEREO
CLOCK
DATA
ENABLE
MPX
3104 213 34851
8204 090 5532

IC 6105



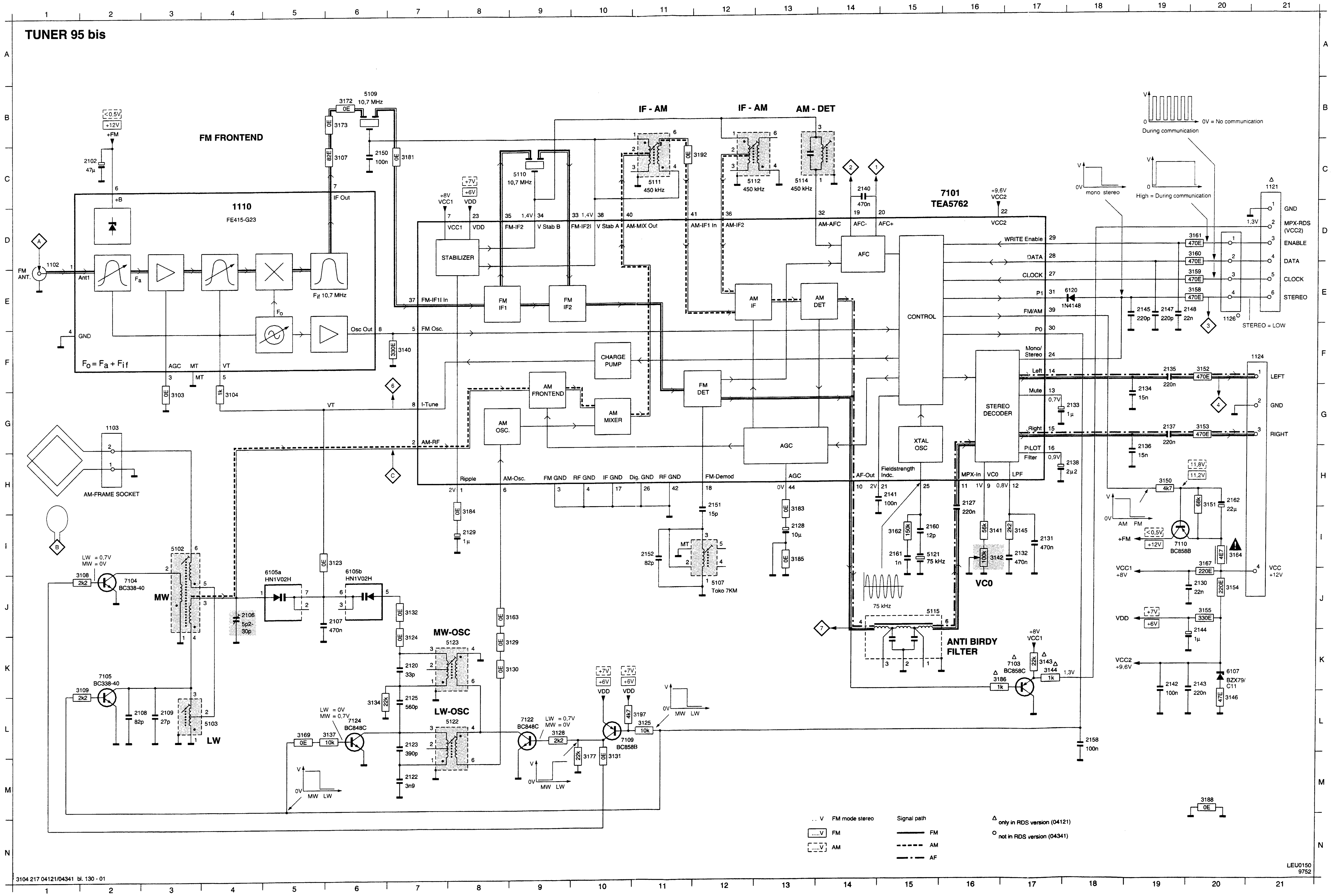


△ only in RDS version (04121)

○ not in RDS version (04341)

1102	D1
1103	G2
1110	D4
1121	C21
1124	F21
1126	E20
2102	C2
2106	J4
2107	J6
2108	L2
2109	L3
2120	K7
2122	M7
2123	L7
2125	L7
2127	H16
2128	I13
2129	I8
2130	J20
2131	I17
2132	I17
2133	G18
2134	G19
2135	F19
2136	H19
2137	G19
2138	H18
2140	C14
2141	H15
2142	K19
2143	K20
2144	K20
2145	E19
2147	E19
2148	E19
2150	C6
2151	H12
2152	I11
2158	L18
2160	I15
2161	I15
2162	H20
3103	G3
3104	G4
3107	C6
3108	J1
3109	K1
3123	I6
3124	K7
3125	L11
3128	L9
3129	K8
3130	K8
3131	M10
3132	J7
3134	L6
3137	L5
3140	F7
3141	I16
3142	I16
3143	K17
3144	K17
3145	I17
3146	L20
3150	H19
3151	I20
3152	F20
3153	G20
3154	J20
3155	J20
3158	E19
3159	E19
3160	D19
3161	D19
3162	I15
3163	J8
3164	I20
3167	I20
3169	L5
3172	B6
3173	B6
3177	M10
3181	C7
3183	I13
3184	I8
3185	I13
3186	K16
3188	M20
3192	C12
3197	L11
5102	I3
5103	L4
5107	J12
5109	B6
5110	C9
5111	C11
5112	C12
5114	C13
5115	J15
5121	I15
5122	L7
5123	K7
6105a	I5
6105b	I6
6107	K20
6120	E17
7101	C15
7103	K17
7104	J2
7105	K2
7109	L10
7110	I19
7122	L9
7124	L6

TUNER 95 bis


FM FRONTEND
1110
FE415-G23
FM ANT.
1102
Ant1
GND
IF Out
Osc Out
Fa
Fo
Fif 10,7 MHz
Fo = Fa + Fif
AGC
MT
VT
+B
3103
3104
3107
3173
3172
5109
10,7 MHz
2150
100n
3181
3140
330E
+FM
+12V
<0.5V
2102
47µ
IF - AM
IF - AM
AM - DET
5110
10,7 MHz
5111
450 kHz
5112
450 kHz
5114
450 kHz
3192
2140
470n
7101
TEA5762
+9,6V
VCC2
+8V
VCC1
+7V
+6V
VDD
STABILIZER
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
FM-IF1 In
FM Osc.
I-Tune
AM-RF
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
AGC
XTAL OSC
STEREO DECODER
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/Stereo
Left
Mute
Right
PILOT Filter
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AF-Out
Fieldstrength Indc.
MPX-In
VCO
LPF
1103
AM-FRAME SOCKET
5102
MW
LW
5103
7104
BC338-40
7105
BC338-40
3108
2k2
3109
2k2
LW = 0,7V
MW = 0V
2108
82p
2109
27p
2106
5p2-30p
6105a
HN1V02H
6105b
HN1V02H
2107
470n
3123
3132
3124
MW-OSC
5123
2120
33p
2125
560p
3134
22k
LW-OSC
5122
2123
390p
2122
3n9
3163
3129
3130
7124
BC848C
3169
0E
3137
10k
LW = 0V
MW = 0,7V
7122
BC848C
LW = 0,7V
MW = 0V
3128
2k2
3177
22k
3131
7109
BC858B
3197
4k7
3125
10k
MW LW
5107
Toko 7KM
2151
15p
2152
82p
3184
2129
1µ
3183
2128
10µ
3185
2141
100n
3162
150k
2161
1n
2160
12p
5121
75 kHz
75 kHz
5115
ANTI BIRDY FILTER
2127
220n
3141
56k
3142
100k
VCO
3145
2k2
2132
470n
2131
470n
2133
1µ
2138
2µ2
2134
15n
2135
220n
3152
470E
2136
15n
2137
220n
3153
470E
1124
LEFT
GND
RIGHT
VCC
+12V
1121
GND
MPX-RDS (VCC2)
ENABLE
DATA
CLOCK
STEREO
1126
STEREO = LOW
3161
3160
3159
3158
470E
6120
1N4148
2145
220p
2147
220p
2148
22n
0V = No communication
During communication
High = During communication
mono stereo
AM FM
3150
4k7
3151
68k
2162
22µ
7110
BC858B
11,8V
11,2V
3164
4E7
3167
220E
VCC1
+8V
2130
22n
3154
220E
3155
330E
2144
1µ
VDD
VCC2
+9,6V
6107
BZX79/C11
3146
47E
2142
100n
2143
220n
7103
BC858C
3186
1k
3143
22k
3144
1k
1,3V
2158
100n
3188
0E
FM mode stereo
FM
AM
Signal path
FM
AM
AF
only in RDS version (04121)
not in RDS version (04341)
3104 217 04121/04341 bl. 130 - 01
LEU0150
9752

ELECTRICAL PARTS LIST - TUNER 95 BOARD

MISCELLANEOUS

1102	4822 267 10283	Socket Coaxial IEC 75R
1103	4822 265 31184	JST Connector 2 pin
1110	4822 210 10739	Frontend Assembly FE415-G23

CAPACITORS

2102	4822 124 40433	47µF 20% 25V
2106	4822 125 60102	Trimmer 5,2-30pF 100V
2107	4822 121 51252	470nF 5% 63V
2108	4822 126 13695	82pF 1% 63V
2109	4822 126 13691	27pF 1% 63V
2120	5322 122 32659	33pF 5% 50V
2122	5322 126 10465	3,9nF 10% 63V
2125	4822 121 10578	560P 1% 630V
2127	4822 122 32927	220nF +80/-20% 50V
2128	4822 124 41579	10µF 20% 50V
2129	4822 124 40242	1µF 20% 63V
2130	4822 126 11585	22nF +80/-20% 25V
2131	4822 122 33325	470nF 16V
2132	4822 122 33325	470nF 16V
2133	4822 124 40242	1µF 20% 63V
2134	4822 126 13188	15nF 5% 63V
2135	4822 122 32927	220nF +80/-20% 50V
2136	4822 126 13188	15nF 5% 63V
2137	4822 122 32927	220nF +80/-20% 50V
2138	4822 124 41576	2,2µF 20% 50V
2140	4822 121 51252	470nF 5% 63V
2141	4822 122 31947	100nF 20% 63V
2142	4822 122 31947	100nF 20% 63V
2143	4822 122 32927	220nF +80/-20% 50V
2144	4822 124 40242	1µF 20% 63V
2145	4822 122 33575	220pF 5% 50V
2147	4822 122 33575	220pF 5% 50V
2148	4822 122 33809	22nF 20% 50V
2150	4822 122 31947	100nF 20% 63V
2151	4822 126 14236	50V 15pF 5%
2152	4822 126 13695	82pF 1% 63V
2158	4822 122 31947	100nF 20% 63V
2160	4822 122 32139	12pF 2% 63V
2161	5322 122 34123	1nF 10% 50V
2162	4822 124 81151	22µF 50V

RESISTORS

3103	4822 051 20008		0R Jumper 0805
3104	4822 051 10102		1k 2% 0,25W
3107	4822 051 20829		82R 5% 0,1W
3108	4822 117 11449		2k2 1% 0,1W
3109	4822 117 11449		2k2 1% 0,1W
3123	4822 051 10008		0R 5% 0,25W
3124	4822 051 10008		0R 5% 0,25W
3125	4822 116 83864		10k 5% 0,5W
3128	4822 116 52256		2k2 5% 0,5W
3129	4822 051 20008		0R Jumper 0805
3130	4822 051 10008		0R 5% 0,25W
3131	4822 051 10008		0R 5% 0,25W
3132	4822 051 20008		0R Jumper 0805
3134	4822 051 20223		22k 5% 0,1W
3137	4822 117 10833		10k 1% 0,1W
3138	4822 051 20008		0R Jumper 0805
3139	4822 051 10008		0R 5% 0,25W
3140	4822 051 20331		330R 5% 0,1W
3141	4822 051 20563		56k 5% 0,1W
3142	4822 100 11163		Trimmer 100k 30% 0,1W
3143	4822 051 20223		22k 5% 0,1W
3144	4822 051 10102		1k 2% 0,25W
3145	4822 117 11449		2k2 1% 0,1W
3146	4822 051 20479		47R 5% 0,1W
3150	4822 051 20472		4k7 5% 0,1W
3151	4822 051 20683		68k 5% 0,1W
3152	4822 051 20471		470R 5% 0,1W
3153	4822 051 20471		470R 5% 0,1W
3154	4822 116 83872		220R 5% 0,5W
3155	4822 116 52219		330R 5% 0,5W
3158	4822 116 83883		470R 5% 0,5W
3159	4822 116 83883		470R 5% 0,5W
3160	4822 116 83883		470R 5% 0,5W
3161	4822 116 83883		470R 5% 0,5W
3162	4822 051 20224		220k 5% 0,1W
3163	4822 051 10008		0R 5% 0,25W
3164	4822 052 10478	⚠	4R7 5% 0,33W
3165	4822 051 10008		0R 5% 0,25W
3167	4822 116 83872		220R 5% 0,5W
3169	4822 051 20008		0R Jumper 0805
3171	4822 051 20008		0R Jumper 0805
3172	4822 051 10008		0R 5% 0,25W
3173	4822 051 20008		0R Jumper 0805
3176	4822 051 20008		0R Jumper 0805
3177	4822 051 20223		22k 5% 0,1W
3181	4822 051 10008		0R 5% 0,25W
3183	4822 051 10008		0R 5% 0,25W
3184	4822 051 10008		0R 5% 0,25W
3185	4822 051 10008		0R 5% 0,25W
3186	4822 051 10102		1k 2% 0,25W
3188	4822 051 10008		0R 5% 0,25W
3192	4822 051 20008		0R Jumper 0805
3197	4822 051 20472		4k7 5% 0,1W

COILS & FILTERS

5102	4822 157 71634	MW AERIAL
5103	4822 157 71635	LW AERIAL
5107	4822 157 11443	FM Discriminator 10,7MHz
5109	4822 157 71639	Ceram Filter 10,7MHz
5110	4822 242 70665	Ceram Filter 10,7MHz
5111	4822 158 60511	AM-IF Filter 450kHz
5112	4822 157 70302	AM-IF Filter 450kHz

ELECTRICAL PARTS LIST - TUNER 95 BOARD

5114	4822 157 70302	AM-IF Filter 450kHz
5115	4822 157 71636	Anti-Birdy Filter
5121	4822 242 10261	X'tal Resonator 75kHz
5122	4822 157 60517	RF Coil AM
5123	4822 157 60517	RF Coil AM

DIODES

6105	4822 130 83075	HN1V02H-B
6107	4822 130 34488	BZX79-B11
6120	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1
7103	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109	5322 130 41983	BC858B
7110	5322 130 41983	BC858B
7122	5322 130 42136	BC848C
7124	5322 130 42136	BC848C

Note: Only the parts mentioned in this list are normal service spare parts.

KARAOKE BOARD

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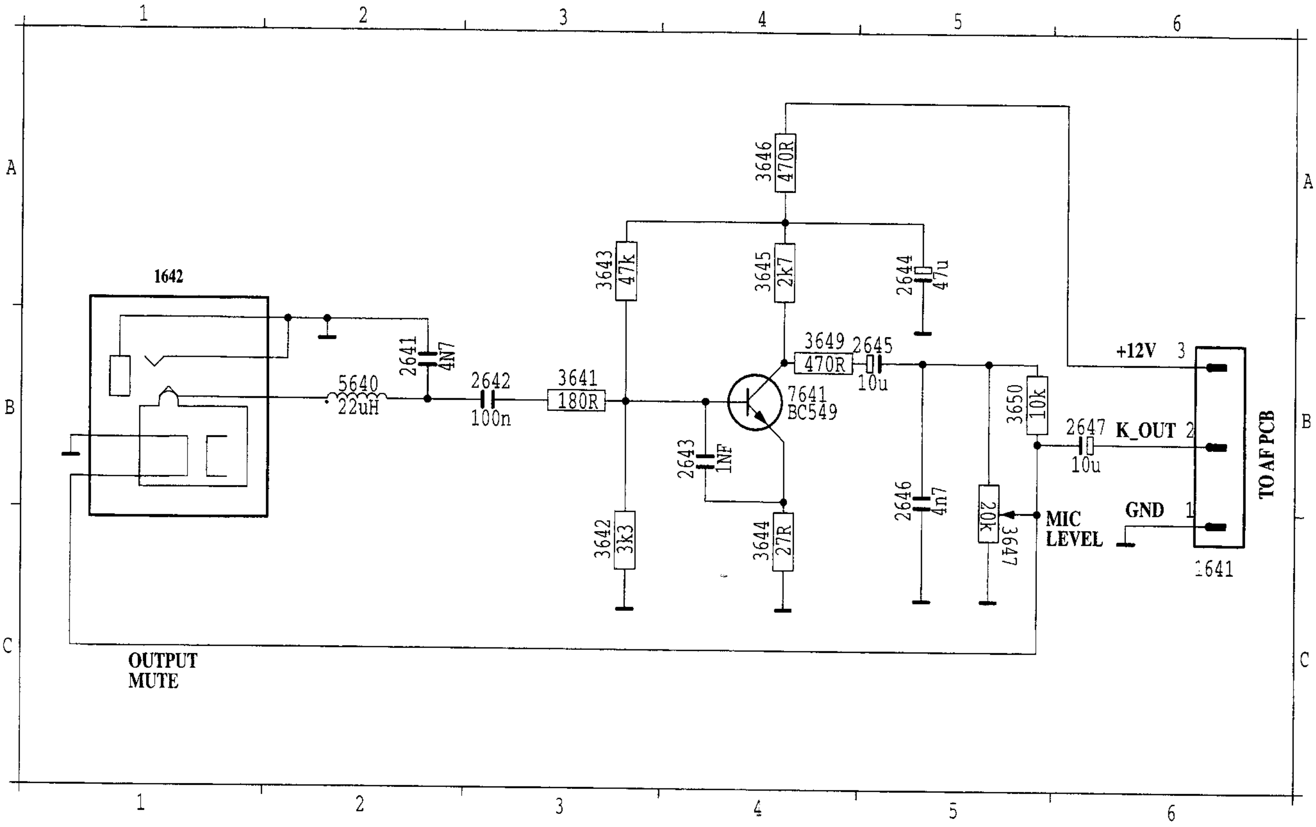
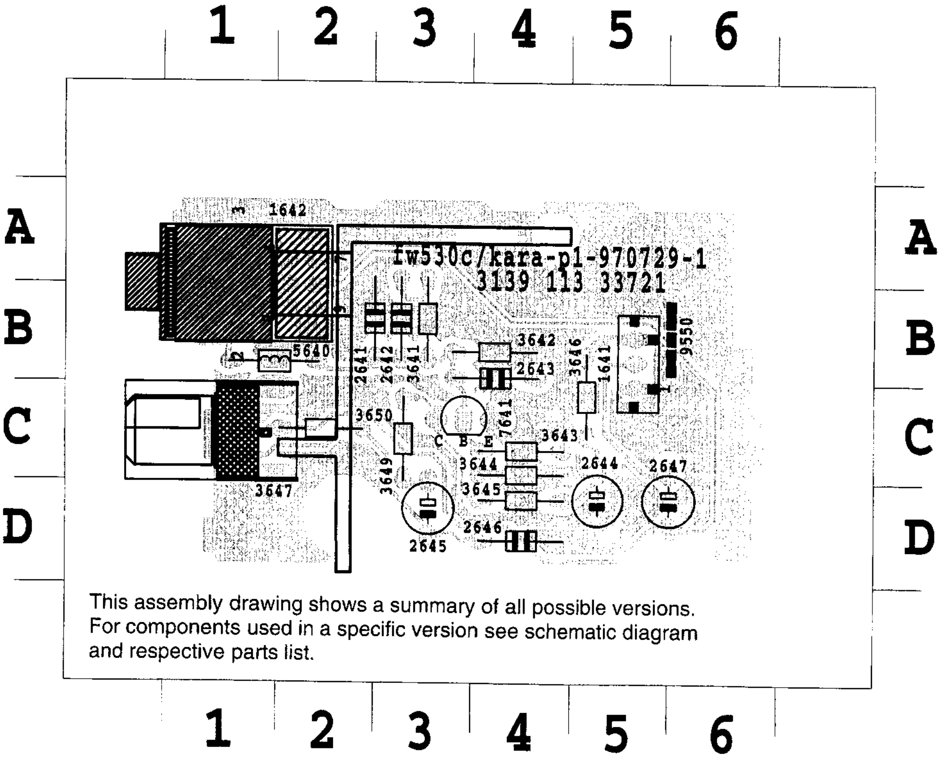
Partlist .... 8 - 3

KARAOKE CIRCUIT & LAYOUT

1641 B 6	2642 B 3	2645 B 5	3641 B 3	3644 C 4	3647 C 5	5640 B 2
1642 A 1	2643 B 4	2646 B 5	3642 C 3	3645 A 4	3649 B 4	7641 B 4
2641 B 2	2644 A 5	2647 B 6	3643 A 3	3646 A 4	3650 B 5	


1
2
3
4
5
6
A
B
C
1642
5640
22uH
2641
4N7
2642
100n
3641
180R
3643
47k
3642
3k3
2643
1NF
3646
470R
3645
2k7
7641
BC549
3644
27R
3649
470R
2645
10u
2644
47u
2646
4n7
3650
10k
20k
3647
MIC
LEVEL
2647
10u
+12V
3
K_OUT
2
GND
1
1641
TO AF PCB
OUTPUT
MUTE

1641 B 5	**2643 B 4**	**2647 D 6**	**3644 D 4**	**3649 C 2**
1642 B 1	**2644 D 5**	**3641 B 3**	**3645 D 4**	**5640 B 1**
2641 B 2	**2645 D 3**	**3642 B 3**	**3646 C 4**	**7641 C 3**
2642 B 3	**2646 D 4**	**3643 C 4**	**3647 C 1**	**9550 B 6**


1
2
3
4
5
6
A
B
C
D
1642
fw530c/kara-p1-970729-1
3139 113 33721
5640
2641
2642
3641
3642
2643
3646
1641
9550
3650
7641
C
B
E
3643
3649
3644
3645
2644
2647
2646
3647
2645

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram and respective parts list.

ELECTRICAL PARTS LIST - KARAOKE BOARD

MISCELLANEOUS

1642	4822 267 40898	Mic. Socket

CAPACITORS

2641	4822 126 11714	4,7nF 20%
2642	4822 126 12882	100nF +80/-20% 50V
2643	4822 122 33197	1nF 10% 50V
2644	4822 124 41751	47µF 20% 50V
2645	4822 124 41579	10µF 20% 50V
2646	4822 126 11714	4,7nF 20%
2647	4822 124 41579	10µF 20% 50V

RESISTORS

3641	4822 116 52213	180R 5% 0,5W
3642	4822 116 52269	3k3 5% 0,5W
3643	4822 116 83884	47k 5% 0,5W
3644	4822 116 52188	27R 5% 0,5W
3645	4822 116 52263	2k7 5% 0,5W
3646	4822 116 83883	470R 5% 0,5W
3647	4822 101 21204	20KA
3649	4822 116 83883	470R 5% 0,5W

COIL

5640	4822 157 52983	22µH 10%

TRANSISTOR

7641	4822 130 41096	BC550C

Note: Only the parts mentioned in this list are normal service parts.

ETF5 TAPE MODULE

(Non-Dolby Version)

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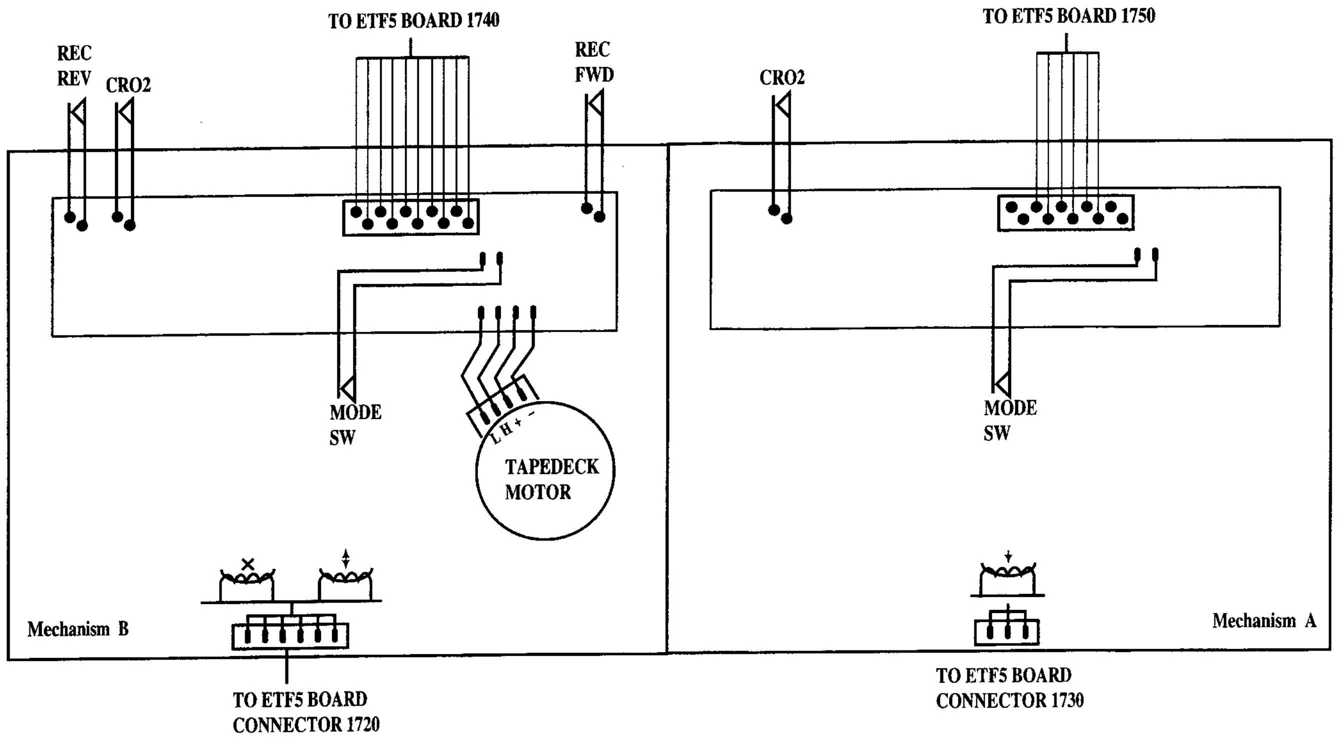
Tapedeck wiring (Double deck)



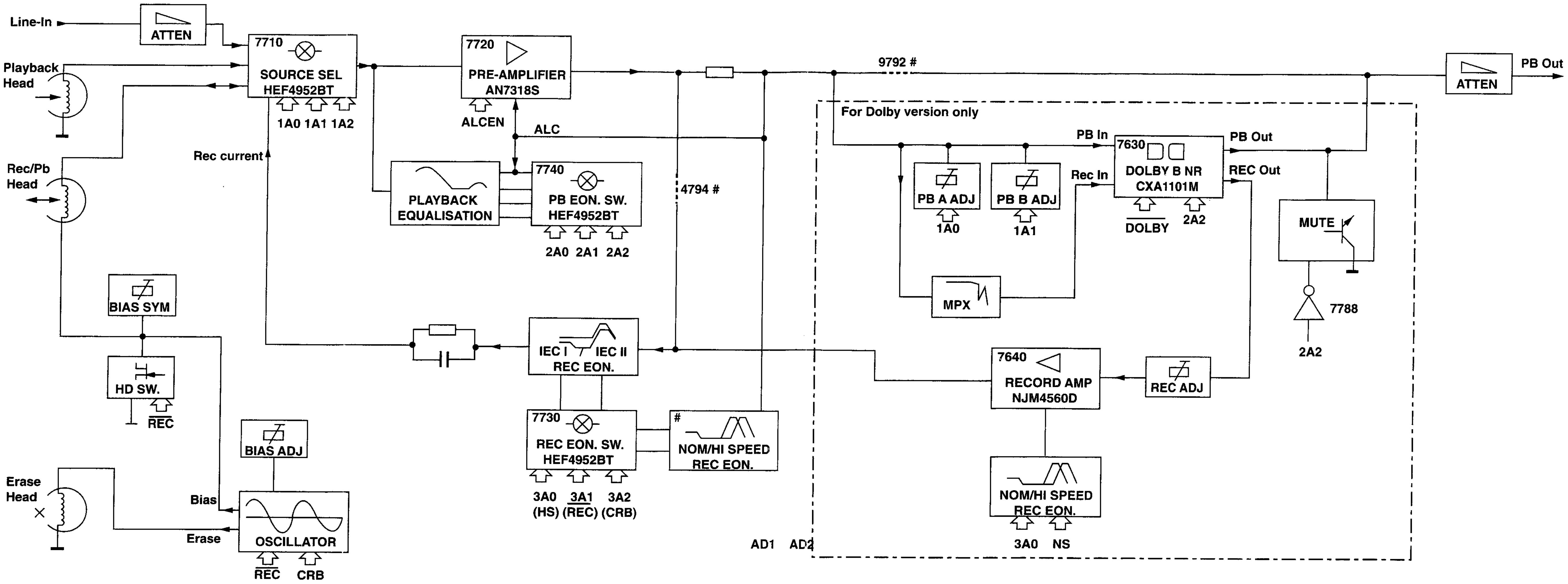
TO ETF5 BOARD 1740
REC REV
CRO2
REC FWD
CRO2
TO ETF5 BOARD 1750
MODE SW
LH+-
TAPEDECK MOTOR
MODE SW
Mechanism B
Mechanism A
TO ETF5 BOARD CONNECTOR 1720
TO ETF5 BOARD CONNECTOR 1730

OPTIONS / VARIANTS TABLE

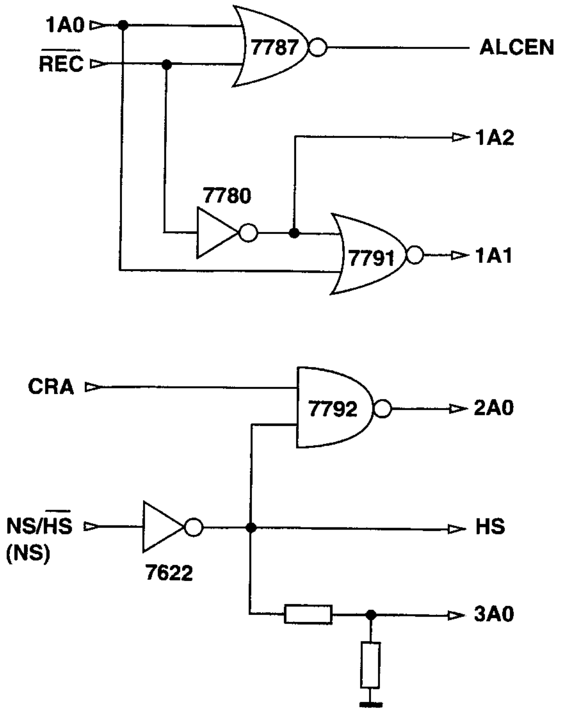
MODULE	ETF5				ETF6	
VARIANT	1	2	3	4	5	6
NAME	**DB/DD/FR**	**ND/DD/FR**	**ND/SD**	**ND/DD/FF**	**ND/DD/FR**	**ND/DD/FF**
Deck configuration	double	double	single	double	double	double
Autoreverse	yes (B)	yes (B)	yes	no	yes (B)	no
Auto-replay	no	no	no	yes (B)	no	yes (B)
Motor configuration	single	single	single	single	single	single
Auto tape type selection	yes	yes	yes	yes	yes	yes
Dolby B type Noise Reduction	yes	no	no	no	no	no
19 kHz pilot suppression	yes	no	no	no	no	no
High speed dubbing	yes	yes	no	yes	yes	yes

DB = Dolby B NR
DD = Double Deck
FF = Non-Autoreverse
FR = Autoreverse Deck B
ND = Non-Dolby
SD = Single Deck

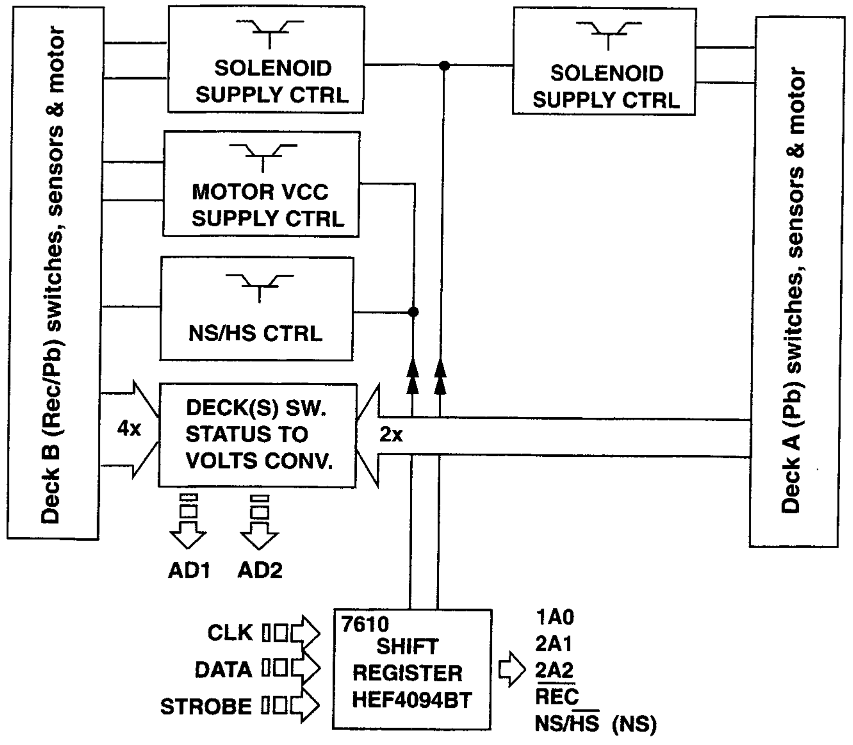
BLOCK DIAGRAM



Line-In
ATTEN
Playback Head
Rec/Pb Head
Erase Head
7710
SOURCE SEL
HEF4952BT
1A0 1A1 1A2
Rec current
7720
PRE-AMPLIFIER
AN7318S
ALCEN
ALC
PLAYBACK EQUALISATION
7740
PB EON. SW.
HEF4952BT
2A0 2A1 2A2
4794 #
9792 #
ATTEN
PB Out
For Dolby version only
PB In
7630
DOLBY B NR
CXA1101M
PB Out
Rec In
REC Out
PB A ADJ
1A0
PB B ADJ
1A1
DOLBY
2A2
MUTE
7788
2A2
MPX
7640
RECORD AMP
NJM4560D
REC ADJ
NOM/HI SPEED
REC EON.
3A0 NS
BIAS SYM
HD SW.
REC
BIAS ADJ
Bias
Erase
OSCILLATOR
REC CRB
IEC I
IEC II
REC EON.
7730
REC EON. SW.
HEF4952BT
3A0 3A1 3A2
(HS) (REC) (CRB)
#
NOM/HI SPEED
REC EON.
AD1 AD2



1A0
REC
7787
ALCEN
1A2
7780
7791
1A1
CRA
7792
2A0
NS/HS
(NS)
7622
HS
3A0



Deck B (Rec/Pb) switches, sensors & motor
SOLENOID SUPPLY CTRL
MOTOR VCC SUPPLY CTRL
NS/HS CTRL
DECK(S) SW. STATUS TO VOLTS CONV.
4x
2x
AD1 AD2
SOLENOID SUPPLY CTRL
Deck A (Pb) switches, sensors & motor
CLK
DATA
STROBE
7610
SHIFT REGISTER
HEF4094BT
1A0
2A1
2A2
REC
NS/HS (NS)

NOTE: # For Non-dolby version only
Only 1 channel is presented.

▯▯⇨ MicroProcessor Control / Communication lines

⇨ Direct / Indirect Control lines from Shift Registers

Brief introduction

General

1. Playback Mode
   Signal from the playback head Deck A or Deck B is selected and fed through by the Mode Selector IC7710 (HEF4952B). The signal is amplified by amplifier IC7720 (AN7318S) before feeding to the IC7740 (HEF4952B) and then output to the AF Board through pins 5 and 6 of the connector 1701.

2. Recording Mode
   Recording Signal is selected and fed through by the Mode Selector IC7710 (HEF4952B) which is then amplified by the amplifier IC7720 (AN7318S). The amplified output signal will pass through IC7730 (HEF4952B) and then back to IC7710 (HEF4952B) before registered into the Rec/PB Head of Deck B.

3. Dubbing Mode
   In Dubbing mode, signal from the playback head Deck A is selected and fed through by the Mode Selector IC7710 (HEF4952B) which is then equalised for playback mode by the amplifier IC7720 (AN7318S) so that a flat response is obtained after the pre-amp. The equalised signal will then follow the same path as in the Recording mode.

4. Mode Selector
   The Mode Selector IC7710 (HEF4952B) caters for 4 inputs signal, namely Playback Signal from Deck A, Playback Signal from Deck B, Recording Signal and Dubbing Signal.

5. Amplifier PB/REC
   Amplifier IC7720 (AN7318S) is for the purpose of amplifying the Playback and Recording signal from the Mode Selector.

6. Automatic Level Control (ALC)
   ALC circuit consists of resistors (3765, 3766, 3767), capacitors (2762 , 2763) and control by transistor 7787 (BC847B). ALC limits the amplifier output to a constant value when input signal becomes too large, thus limiting recording current to below saturation level, to prevent recording distortion.

7. Muting Circuit (For Non-Dolby only)
   Switch S4 of the IC7740 (HEF4952B) is for the purpose of muting the output during Recording mode. During Recording mode, S4 is closed and shorted to the ground.

8. IC7740 (HEF4952B)
   The function of the IC7740 (HEF4952B) is to change time constant between 120us Ferro (IEC I) and 70us Chrome (IEC II) during playback mode. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II). This IC will switch to Flat Gain during the Recording mode.

9. IC7730 (HEF4952B)
   The function of the IC7730 (HEF4952B) is to change gain and time constant according to tape type and recording speed to boost recording current at higher frequency during recording to compensate for head loss. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II).

10. Bias Level
    Bias Level making use of the Variable resistor (3773) for adjusting the optimal level of the bias current for Ferro or Chrome.

11. Bias Symm (For Dolby only)
    Bias Symm making use of the Variable resistor (3785) to adjust the bias current for the left and the right channel to be equal.

12. PB Switch
    Playback Switch which consists of the FETs 7785 (For Dolby only) & 7786 (J111) is for the purpose of providing a virtual ground for the Rec/PB Head (Deck B) during Playback mode. During the Playback mode, the FETs are turn on and shorted pin 2 and 4 of connector 1720 to the ground. During Recording mode, the FETs are turn off to allow the oscillator signal to be superposition onto the Recording signal for recording.

13. Motor Speed
    During High speed dubbing, a feedback signal from the uP through pin 03 of the IC7610 (HEF4094BT) will trigger the transistors 7622 (BC847B) and 7616 (BC857B) to cause a change in the voltage level between High and Low, thus changing the speed of the motor.

14. IC7610 (HEF4094BT)
    IC7610 (HEF4094BT) is a Shift Register use for issues the logic for cmos switch ICs (HEF4952B) via 1A0, 2A1 and 2A2. IC7610(HEF4094BT) also issues logic to On/Off SOL_A, SOL_B and MOT. Recording speed is also controlled by IC7610(HEF4094BT) via NS/HS.

Dolby Circuit (For sets with Dolby B NR only)

15. IC7630 (CXA1101M)
    IC7630 (CXA1101M) in the Dolby circuit is a Dolby Noise Reduction Type B IC for the Playback and Recording signal. Noise Reduction ON/OFF are controlled by $\overline{\text{DOLBY}}$, which is from CLK, direct from uP. After clocking in DATA, CLK is set to HIGH/ LOW for NR OFF/ON.

16. 19kHz Filter
    The 19kHz filters 5631 & 5632 (LXD-210) in the Dolby circuit is for the purpose of filtering the 19kHz Pilot Tone (for Tuner signal only) of the Recording signal.

17. Level Adjust
    The Variable resistor 3635, 3636,3641 and 3642 in the Dolby circuit is for adjusting the playback level of the Dolby reference (400Hz , 200nWb/m). Transistor 7631, 7632 are ON to enable adjustment of 3641, 3642 during Playback Deck A. Transistor 7633, 7634 and 3635, 3636 are active for Playback Deck B.

18. Amplifier IC7640 (NJM4560M)
    The Amplifiers 7640A & 7640B (NJM4560M) in the Dolby circuit is for the purpose of amplified the Recording signal.

19. Muting Circuit
    The muting circuit which consists of transistors 7788, 7789 and 7790 (BC847B) is for the purpose of muting the output during Recording mode.

NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

CR	Chrome (IEC type II)
DB	Dolby NR type B
DD	Double Deck
DM	Double Motor
FE	Ferro (IEC type I)
FF	Non Auto Reverse
FR	Auto Reverse on Deck B
Gnd x	Ground x
HSD	High speed dubbing
ND	Non Dolby
NR	Noise Reduction
NSD	Normal speed dubbing
PB	Playback
REC	Record
S/A	Sub-assy
SD	Single Deck
SM	Single Motor

CONNECTORS ASSIGNMENTS:

CONNECTOR 1701 — INTERCONNECTION TO AF5 BOARD

○	1	REC-R	Record input right
○	2	REC-L	Record input left
○	3	GND A	AF Ground
○	4	+12V	D.C. supply (+12V) in
○	5	TAPE-R	Playback output right
○	6	TAPE-L	Playback output left
○	7	-CMOS	Negative d.c. supply (-9V) for CMOS ICs

CONNECTOR 1703 — INTERCONNECTION TO AF5 BOARD

○	1	GND M	Motor Ground
○	2	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid

CONNECTOR 1706 — INTERCONNECTION TO FRONT BOARD

○	1	AD2	Deck sensing switches output voltage / Deck A EOT
○	2	AD1	Deck sensing switches output voltage / Deck B EOT
○	3	+5	DC supply +5V for ADC network
○	4	GND P	Control & Oscillator Ground
○	5	CLK	HEF4094BT shift register Clock line
○	6	DATA	HEF4094BT shift register Data line
○	7	STROBE	HEF4094BT shift register Strobe line

CONNECTOR 1710 — DECK B HEADS CONNECTON ***(For ETF6 only)***

○	1	B R/P HD L+	R/P Head left channel positive
○	2	B R/P HD R-	R/P Head right channel positive
○	3	CMN	R/P Head return ground
○	4	ERASE HEAD	Erase Head
○	5	GND A	Erase Head ground

CONNECTOR 1720 — DECK B HEADS CONNECTON ***(For ETF5 only)***

○	1	B R/P HD L+	R/P Head left channel positive
○	2	B R/P HD L-	R/P Head left channel negative
○	3	B R/P HD R+	R/P Head right channel positive
○	4	B R/P HD R-	R/P Head right channel negative
○	5	ERASE HEAD	Erase Head
○	6	GND A	Erase Head ground

CONNECTOR 1730 — DECK A HEAD CONNECTIONS ***(For Double Deck versions only)***

○	1	A PB HD R+	Pb Head right channel positive
○	2	GND A	Pb Head return ground shield
○	3	A PB HD L+	Pb Head left channel positive

CONNECTOR 1740 — DECK B CONTROL INTERFACE ***(For ETF5 Double Deck only)***

○	1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
○	2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
○	3	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
○	4	PHOTO B	Photo sensor output (tape movement indication)	
○	5	SOL B	Solenoid supply	
○	6	Vcc	Deck / Motor supply	
○	7	MODE	Mode switch (head engagement)	[open=off: close=engaged]
○	8	GND M	Deck / Motor ground	
○	9	H	H pin for motor	
○	10	L	L pin for motor	

CONNECTOR 1750 — DECK A CONTROL INTERFAC ***(For ETF5 Double Deck only)***

○	1	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
○	2	PHOTO A	Photo sensor output (tape movement indication)	
○	3	SOL A	Solenoid supply	
○	4	Vcc	Deck/Motor supply	
○	5	MODE	Mode switch (head engagement)	[open=off: close=engaged]
○	6	GND M	Deck/Motor ground	

CONNECTOR 1760 — DECK B CONTROL INTERFACE ***(For ETF5 Single Deck only)***

○	1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
○	2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
○	3	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
○	4	PHOTO B	Photo sensor output (tape movement indication)	
○	5	SOL B	Solenoid supply	
○	6	Vcc	Deck / Motor supply	
○	7	MODE	Mode switch (head engagement)	[open=off: close=engaged]
○	8	GND M	Deck / Motor ground	

CONNECTOR 1770 — DECK B CONTROL INTERFACE ***(For ETF6 only)***

○	1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
○	2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
○	3	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
○	4	PHOTO B	Photo sensor output (tape movement indication)	
○	5	SOL B	Solenoid supply for deck B	
○	6	Vcc	Deck / Motor supply	
○	7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
○	8	GND M	Deck / Motor ground	
○	9	L	L pin for motor	
○	10	H	H pin for motor	
○	11	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
○	12	SOL A	Solenoid supply for deck A	
○	13	PHOTO A	Photo sensor output (tape movement indication)	

TAPE MECHANISM A ELECTRONICS

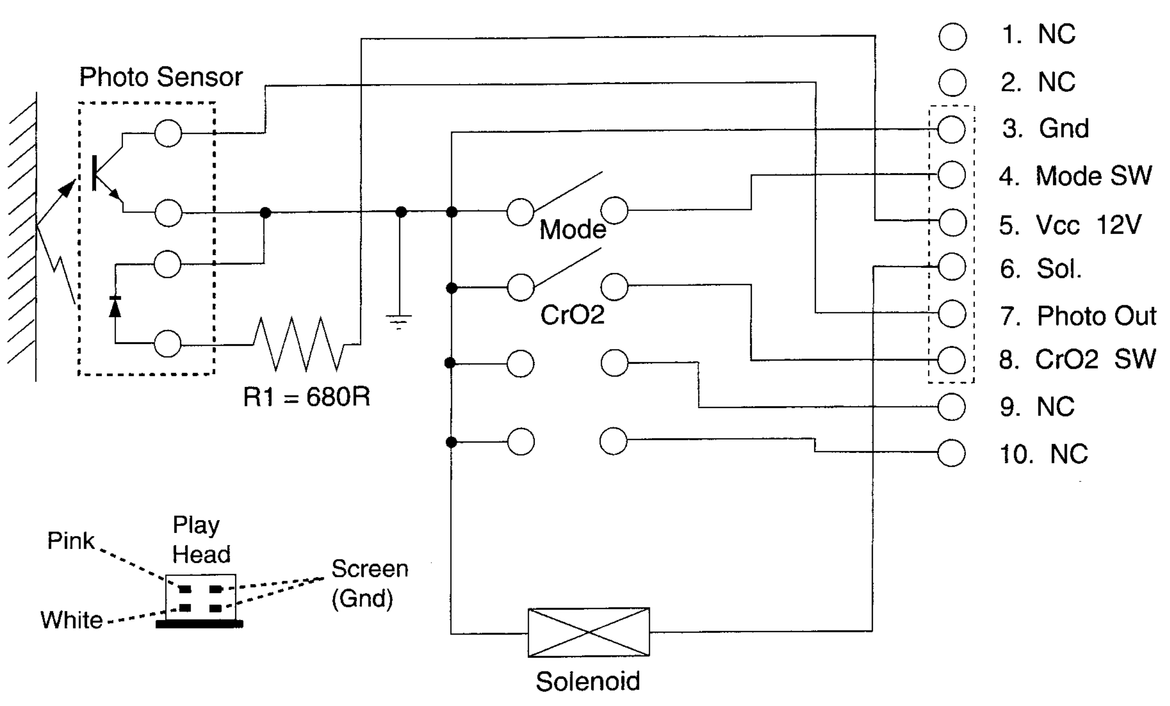
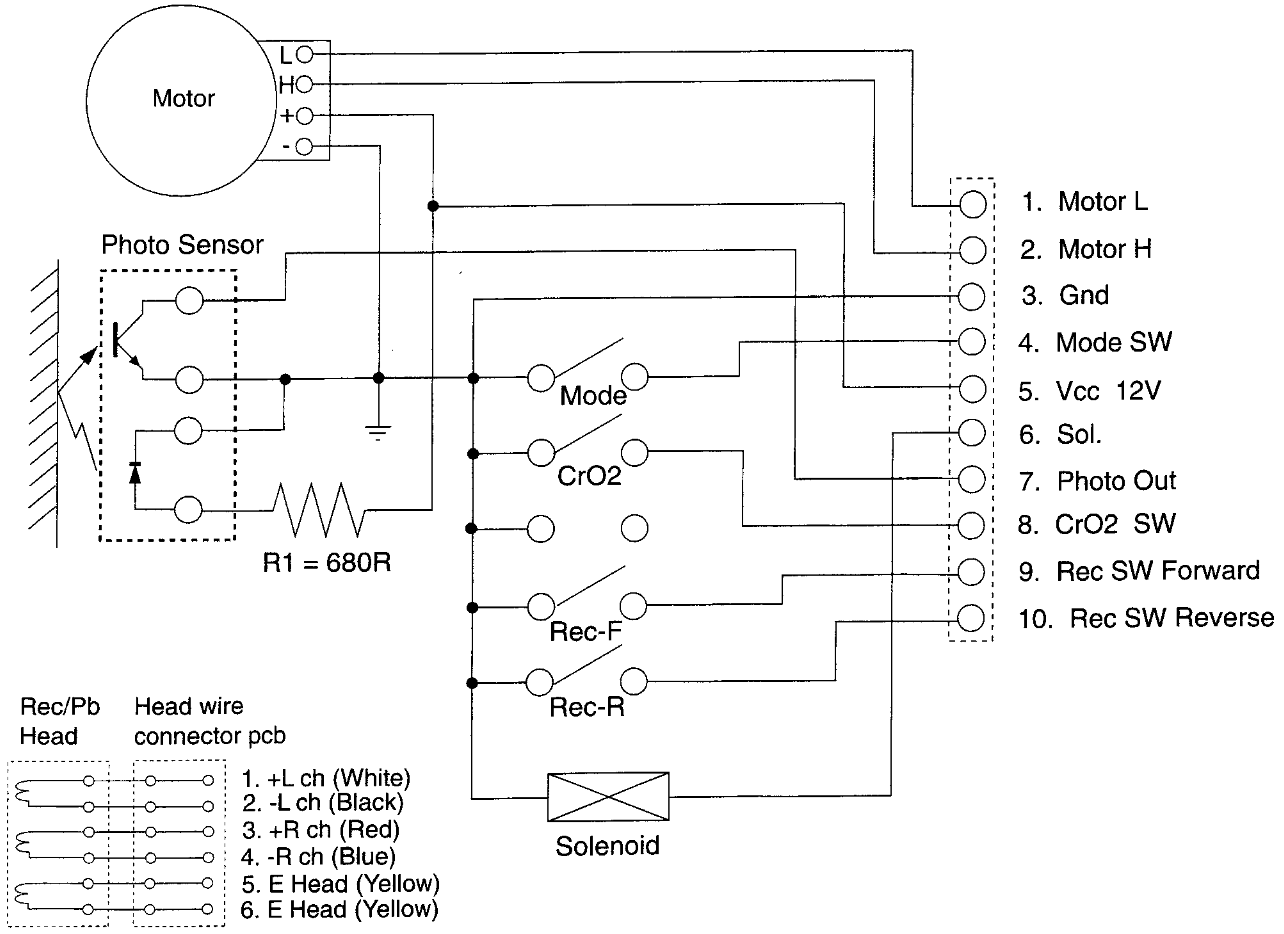


Photo Sensor
R1 = 680R
Mode
CrO2
Pink
Play Head
White
Screen (Gnd)
Solenoid
1. NC
2. NC
3. Gnd
4. Mode SW
5. Vcc 12V
6. Sol.
7. Photo Out
8. CrO2 SW
9. NC
10. NC

TAPE MECHANISM B ELECTRONICS


Motor
L
H
+
-
Photo Sensor
R1 = 680R
Mode
CrO2
Rec-F
Rec-R
Solenoid
Rec/Pb Head
Head wire connector pcb
1. +L ch (White)
2. -L ch (Black)
3. +R ch (Red)
4. -R ch (Blue)
5. E Head (Yellow)
6. E Head (Yellow)
1. Motor L
2. Motor H
3. Gnd
4. Mode SW
5. Vcc 12V
6. Sol.
7. Photo Out
8. CrO2 SW
9. Rec SW Forward
10. Rec SW Reverse

General

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST MOTOR SPEED						
HIGH SPEED	SBC420 (4822 397 30071) 3150Hz	DUBBING	◇1 or ◇2 LEFT RIGHT	frequency counter	3622 *	5040Hz ± 0.5%
NORMAL SPEED		PLAY B			3620	3150Hz ± 0.5%
		PLAY A			check	3150Hz -0.8/+1.8%
CHECK WOW & FLUTTER						
DECK A & B	SBC420 (4822 397 30071) 3150Hz	PLAY	◇1 or ◇2 LEFT RIGHT	W&F-meter	check only	≤0.4 % DIN or ≤0.35 % CCIR *
ADJUST AZIMUTH						
DECK A & B	SBC420 (4822 397 30071) 10kHz	PLAY FWD	◇1 or ◇2 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
		PLAY REV #			right hand screw	

Playback

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
*ADJUST DOLBY PLAYBACK LEVEL **						
DECK A	TCC-130 (4822 397 30269) 200nWb/m	PLAY	◇7 or ◇8 LEFT RIGHT	mV-meter	3641(L), 3642(R)	548mV ±0.5dB
DECK B		PLAY FWD			3635(L), 3636(R)	
		PLAY REV #			Check	548mV ±1dB
CHECK PLAYBACK FREQUENCY RESPONSE						
PB. FREQ. RESP.	SBC420 (4822 397 30071)	PLAY	◇1 or ◇2 LEFT RIGHT	mV-meter	Check	limits see fig.1

* For Dolby version only

For Auto-reverse version only

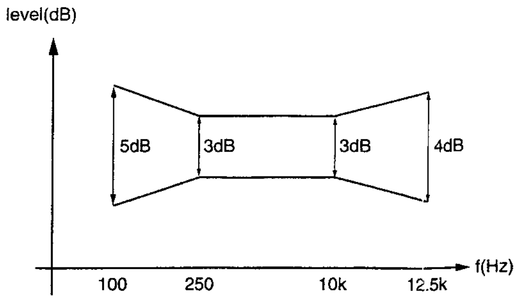


fig. 1

Rec

PRE

DECI

CHE

Inject
100H
10kH
via

Inject
via

Rem

ADJ

Inject
via

Rema

* For

ƷW
ʔV

Out
SW

:or L
:or H
ɟ
ɟe SW
12V

ɩto Out
ɩ2 SW
: SW Forward
ɛc SW Reverse

General

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST MOTOR SPEED						
HIGH SPEED	SBC420 (4822 397 30071) 3150Hz	DUBBING	◇1 or ◇2 LEFT RIGHT	frequency counter	3622 *	5040Hz ± 0.5%
NORMAL SPEED		PLAY B			3620	3150Hz ± 0.5%
		PLAY A			check	3150Hz -0.8/+1.8%
CHECK WOW & FLUTTER						
DECK A & B	SBC420 (4822 397 30071) 3150Hz	PLAY	◇1 or ◇2 LEFT RIGHT	W&F-meter	check only	≤0.4 % DIN or ≤0.35 % CCIR *
ADJUST AZIMUTH						
DECK A & B	SBC420 (4822 397 30071) 10kHz	PLAY FWD	◇1 or ◇2 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
		PLAY REV #			right hand screw	

Playback

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST DOLBY PLAYBACK LEVEL *						
DECK A	TCC-130 (4822 397 30269) 200nWb/m	PLAY	◇7 or ◇8 LEFT RIGHT	mV-meter	3641(L), 3642(R)	548mV ±0.5dB
DECK B		PLAY FWD			3635(L), 3636(R)	
		PLAY REV #			Check	548mV ±1dB
CHECK PLAYBACK FREQUENCY RESPONSE						
PB. FREQ. RESP.	SBC420 (4822 397 30071)	PLAY	◇1 or ◇2 LEFT RIGHT	mV-meter	Check	limits see fig.1

* For Dolby version only
# For Auto-reverse version only

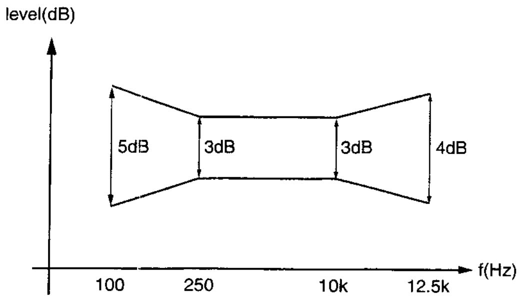


fig. 1

Recording

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
PRE-ADJUST BIAS AND BIAS-SYMMETRY						
DECK B	CrO 2	RECORD	◇5 or ◇6 LEFT RIGHT	mV-meter	3773	995mV
					3785 *	left = right
	FERRO				check only	750mV ± 1.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
Inject 3mV signals 100Hz, 250Hz, 1kHz, 10kHz, 12.5kHz via ◇3 or ◇4	CrO 2	RECORD				
	RECORDED CASSETTE	PLAY	◇1 or ◇2 LEFT RIGHT	mV-meter	check only	limits see fig.2
Inject 1kHz 8.85mV via ◇3 or ◇4	CrO 2	RECORD				
	RECORDED CASSETTE	PLAY	◇1 or ◇2 LEFT RIGHT	THD-meter	check only	≤3%
Remark: If high frequencies are not within limits, decrease bias and re-measure. If distortion is too high increase bias and re-measure.						
ADJUST DOLBY RECORD LEVEL *						
Inject 400Hz 8.85mV via ◇3 or ◇4	CrO 2	RECORD	◇9 or ◇10 LEFT RIGHT	mV-meter	3655 & 3556	420mV
	RECORDED CASSETTE	PLAY	◇7 or ◇8 LEFT RIGHT	mV-meter	check	170mV ± 1dB
Remark: If measured value is out, re-adjust record level up or down slightly to attain play level.						

* For Dolby version only

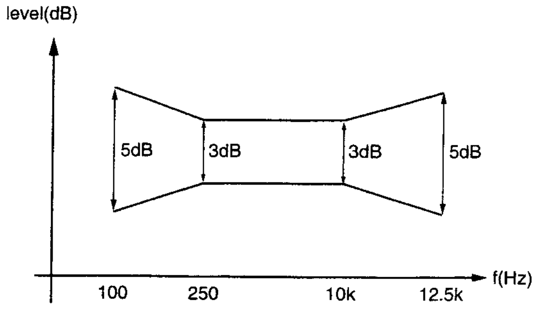
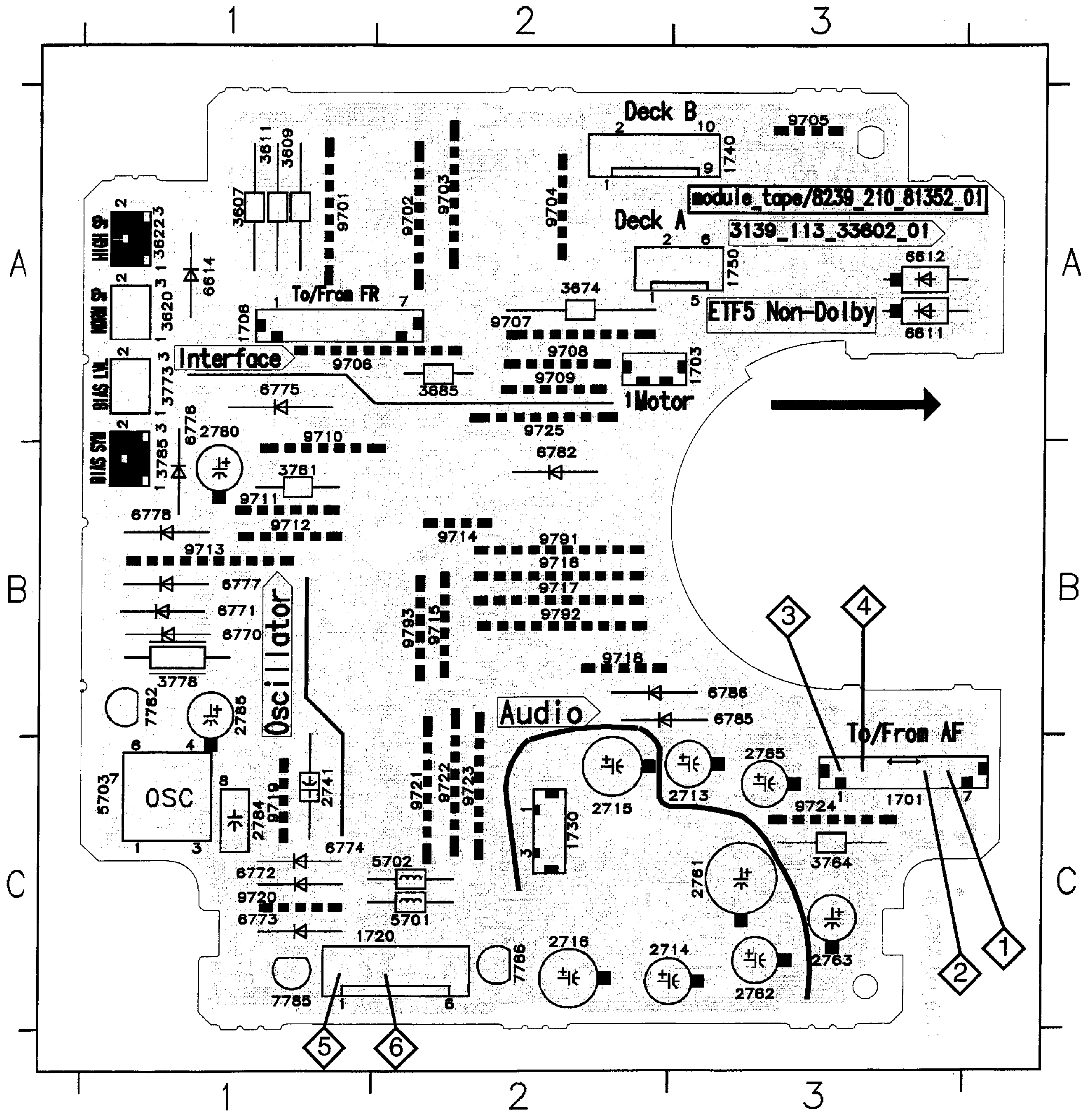


fig. 2

COMPONENT LAYOUT


1
2
3
A
B
C
Deck B
Deck A
module_tape/8239_210_81352_01
3139_113_33602_01
ETF5 Non-Dolby
To/From FR
Interface
Motor
Oscillator
Audio
To/From AF
HIGH SP
NORM SP
BIAS LW
BIAS SW
OSC
1701
1703
1706
1720
1730
1740
1750
2713
2714
2715
2716
2741
2761
2762
2763
2765
2780
2784
2785
3607
3609
3611
3620
3622
3674
3685
3761
3764
3773
3778
3785
5701
5702
5703
6611
6612
6614
6770
6771
6772
6773
6774
6775
6776
6777
6778
6782
6785
6786
7782
7785
7786
9701
9702
9703
9704
9705
9706
9707
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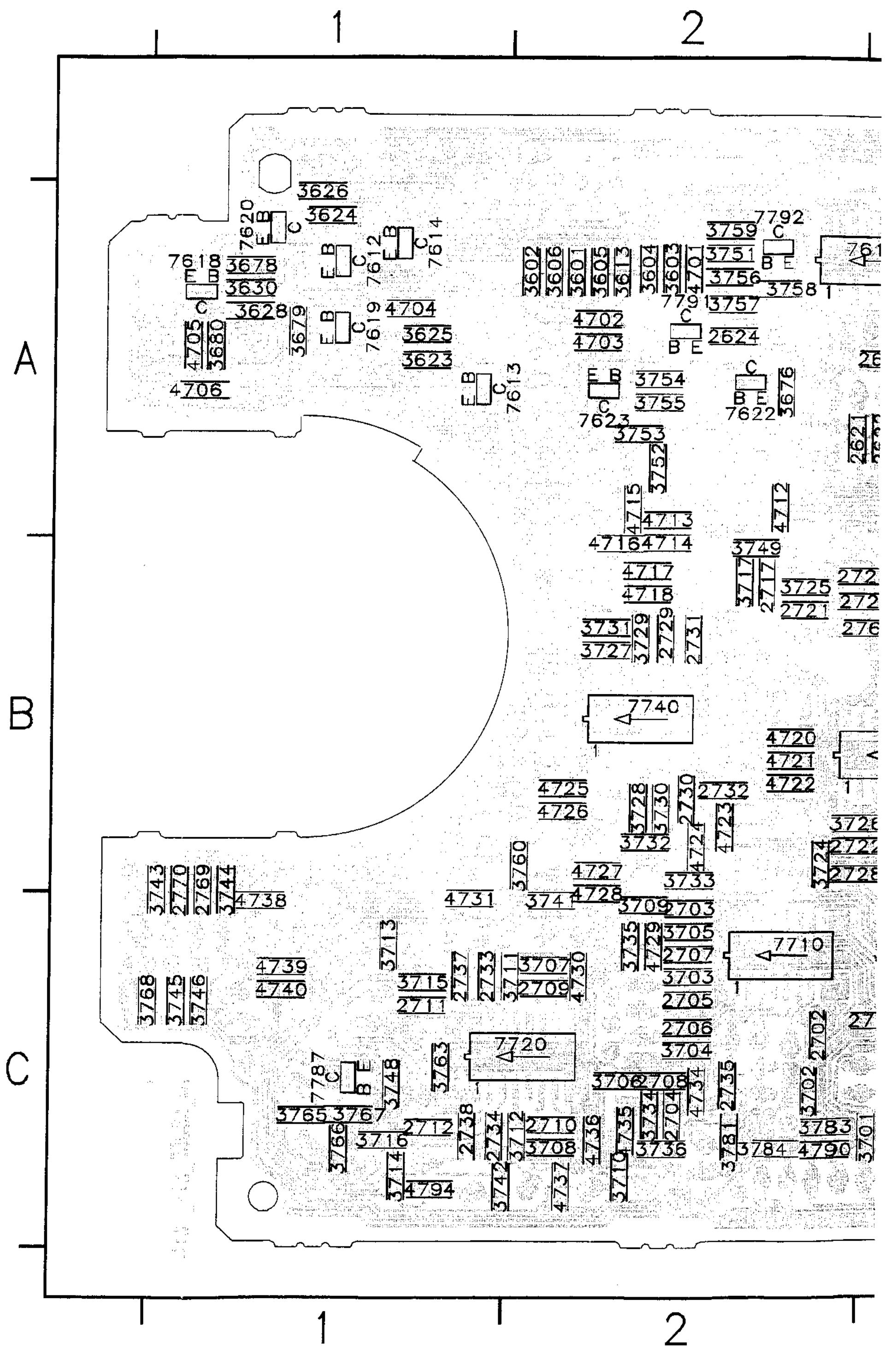
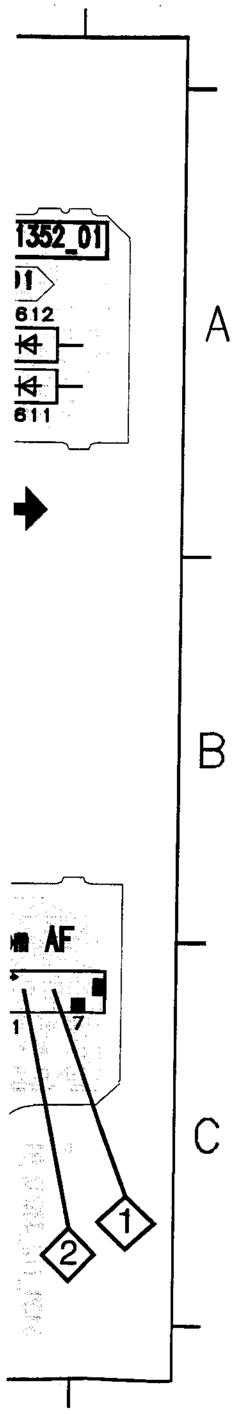
9711
9712
9713
9714
9715
9716
9717
9718
9719
9720
9721
9722
9723
9724
9725
9791
9792
9793
①
②
③
④
⑤
⑥

1701	C3
1703	A2
1706	A1
1720	C2
1730	C2
1740	A2
1750	A3
2713	B3
2714	C3
2715	B2
2716	C2
2741	C1
2761	C3
2762	C3
2763	C3
2765	C3
2780	B1
2784	C1
2785	B1
3607	A1
3609	A1
3611	A1
3620	A1
3622	A1
3674	A2
3685	A2
3761	B1
3764	C3
3773	A1
3778	B1
3785	B1
5701	C2
5702	C2
5703	C1
6611	A3
6612	A3
6614	A1
6770	B1
6771	B1
6772	C1
6773	C1
6774	C1
6775	A1
6776	A1
6777	B1
6778	B1
6782	B2
6785	B3
6786	B3
7782	B1
7785	C1
7786	C2
9701	A1
9702	A2
9703	A2
9704	A2
9705	A3
9706	A2
9707	A2
9708	A2
9709	A2
9710	B1
9711	B1
9712	B1
9713	B1
9714	B2
9715	B2
9716	B2
9717	B2
9718	B2
9719	C1
9720	C1
9721	C2
9722	C2
9723	C2
9724	C3
9725	A2
9791	B2
9792	B2
9793	B2

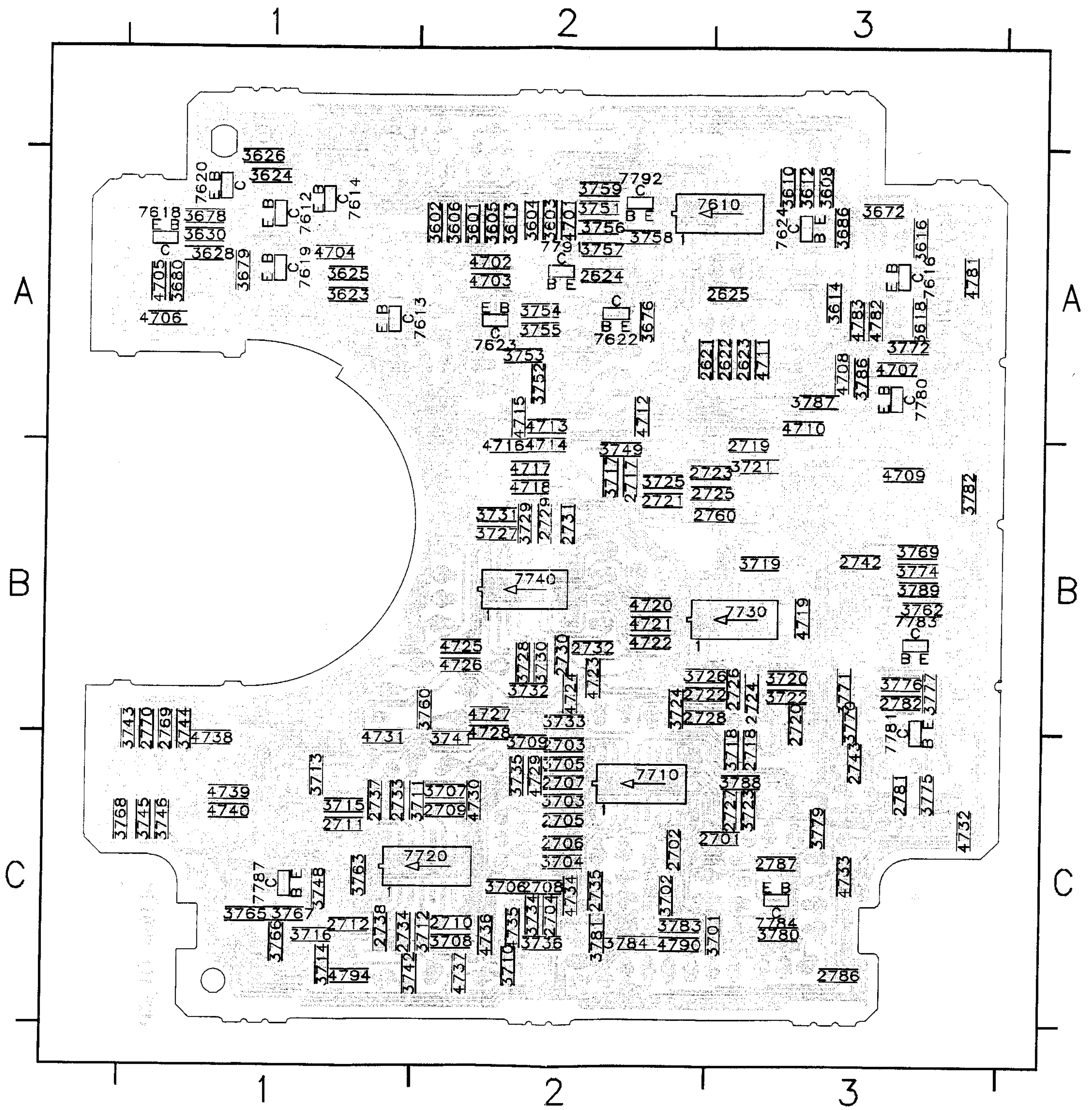
CHIP LAYOUT


1
2
A
B
C
7740
7710
7720
3626
3624
7792
3759
3751
3756
3758
4704
4702
4703
4713
4714
4712
3749
4720
4721
4722
4731
4738
4739
4740
3713

CHIP LAYOUT

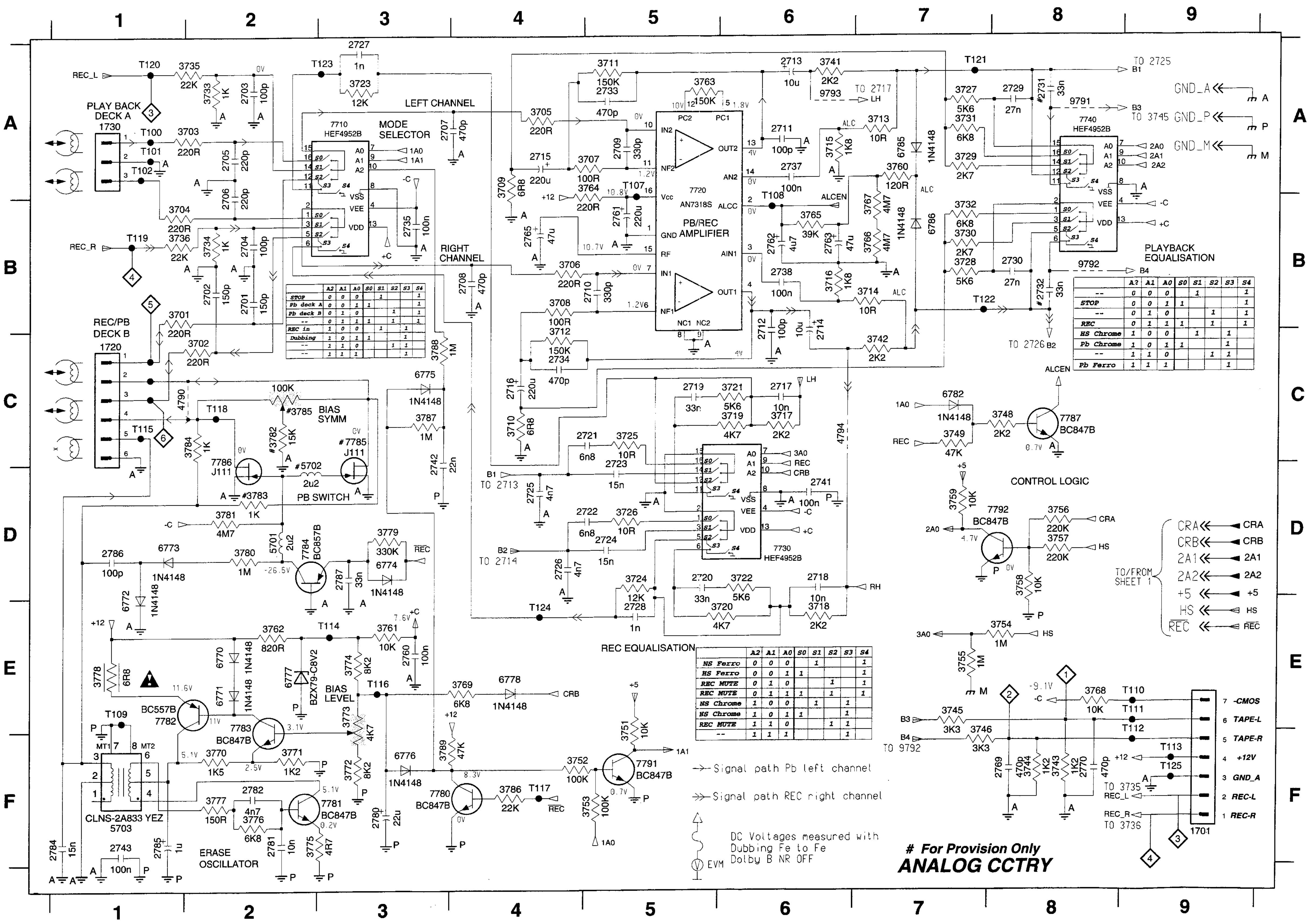


1701	C3	9719	C1
1703	A2	9720	C1
1706	A1	9721	C2
1720	C2	9722	C2
1730	C2	9723	C2
1740	A2	9724	C3
1750	A3	9725	A2
2713	B3	9791	B2
2714	C3	9792	B2
2715	B2	9793	B2
2716	C2		
2741	C1		
2761	C3		
2762	C3		
2763	C3		
2765	C3		
2780	B1		
2784	C1		
2785	B1		
3607	A1		
3609	A1		
3611	A1		
3620	A1		
3622	A1		
3674	A2		
3685	A2		
3761	B1		
3764	C3		
3773	A1		
3778	B1		
3785	B1		
5701	C2		
5702	C2		
5703	C1		
6611	A3		
6612	A3		
6614	A1		
6770	B1		
6771	B1		
6772	C1		
6773	C1		
6774	C1		
6775	A1		
6776	A1		
6777	B1		
6778	B1		
6782	B2		
6785	B3		
6786	B3		
7782	B1		
7785	C1		
7786	C2		
9701	A1		
9702	A2		
9703	A2		
9704	A2		
9705	A3		
9706	A2		
9707	A2		
9708	A2		
9709	A2		
9710	B1		
9711	B1		
9712	B1		
9713	B1		
9714	B2		
9715	B2		
9716	B2		
9717	B2		
9718	B2		



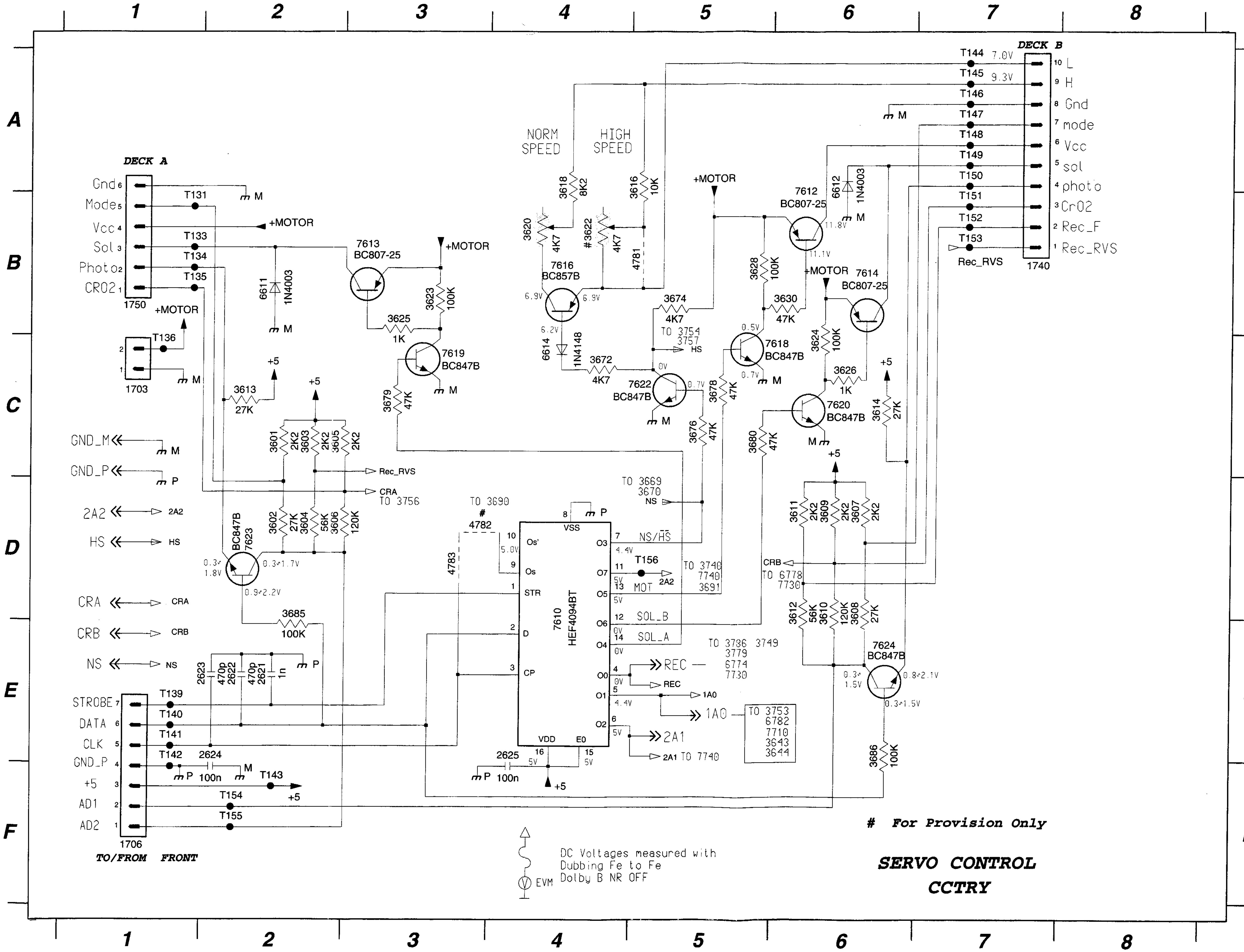
2621	A2	3686	A3	3780	C3	7781	B3
2622	A3	3701	C3	3781	C2	7783	B3
2623	A3	3702	C2	3782	B3	7784	C3
2624	A2	3703	C2	3783	C2	7787	C1
2625	A3	3704	C2	3784	C2	7791	A2
2701	C3	3705	C2	3786	A3	7792	A2
2702	C2	3706	C2	3787	A3		
2703	C2	3707	C2	3788	C3		
2704	C2	3708	C2	3789	B3		
2705	C2	3709	C2	4701	A2		
2706	C2	3710	C2	4702	A2		
2707	C2	3711	C2	4703	A2		
2708	C2	3712	C2	4704	A1		
2709	C2	3713	C1	4705	A1		
2710	C2	3714	C1	4706	A1		
2711	C1	3715	C1	4707	A3		
2712	C1	3716	C1	4708	A3		
2717	B2	3717	B2	4709	B3		
2718	C3	3718	C3	4710	A3		
2719	B3	3719	B3	4711	A3		
2720	B3	3720	B3	4712	A2		
2721	B2	3721	B3	4713	A2		
2722	B2	3722	B3	4714	B2		
2723	B2	3723	C3	4715	A2		
2724	B3	3724	B2	4716	B2		
2725	B3	3725	B2	4717	B2		
2726	B3	3726	B2	4718	B2		
2727	C3	3727	B2	4719	B3		
2728	B2	3728	B2	4720	B2		
2729	B2	3729	B2	4721	B2		
2730	B2	3730	B2	4722	B2		
2731	B2	3731	B2	4723	B2		
2732	B2	3732	B2	4724	B2		
2733	C1	3733	B2	4725	B2		
2734	C1	3734	C2	4726	B2		
2735	C2	3735	C2	4727	B2		
2737	C1	3736	C2	4728	C2		
2738	C1	3741	C2	4729	C2		
2742	B3	3742	C1	4730	C2		
2760	B3	3743	B1	4731	C1		
2769	B1	3744	B1	4732	C3		
2770	B1	3745	C1	4733	C3		
2781	C3	3746	C1	4734	C2		
2782	B3	3748	C1	4735	C2		
2786	C3	3749	B2	4736	C2		
2787	C3	3751	A2	4737	C2		
3601	A2	3752	A2	4738	C1		
3602	A2	3753	A2	4739	C1		
3603	A2	3754	A2	4740	C1		
3604	A2	3755	A2	4781	A3		
3605	A2	3756	A2	4782	A3		
3606	A2	3757	A2	4783	A3		
3608	A3	3758	A2	4790	C2		
3610	A3	3759	A2	4794	C1		
3612	A3	3760	B2	7610	A3		
3613	A2	3762	B3	7612	A1		
3614	A3	3763	C1	7613	A2		
3616	A3	3765	C1	7614	A1		
3618	A3	3766	C1	7616	A3		
3623	A1	3767	C1	7618	A1		
3624	A1	3768	C1	7619	A1		
3625	A1	3769	B3	7620	A1		
3626	A1	3770	B3	7622	A2		
3628	A1	3771	C3	7623	A2		
3630	A1	3772	A3	7624	A3		
3672	A3	3774	B3	7710	C2		
3676	A2	3775	C3	7720	C2		
3678	A1	3776	B3	7730	B3		
3679	A1	3777	B3	7740	B2		
3680	A1	3779	C3	7780	A3		

ANALOG CIRCUIT

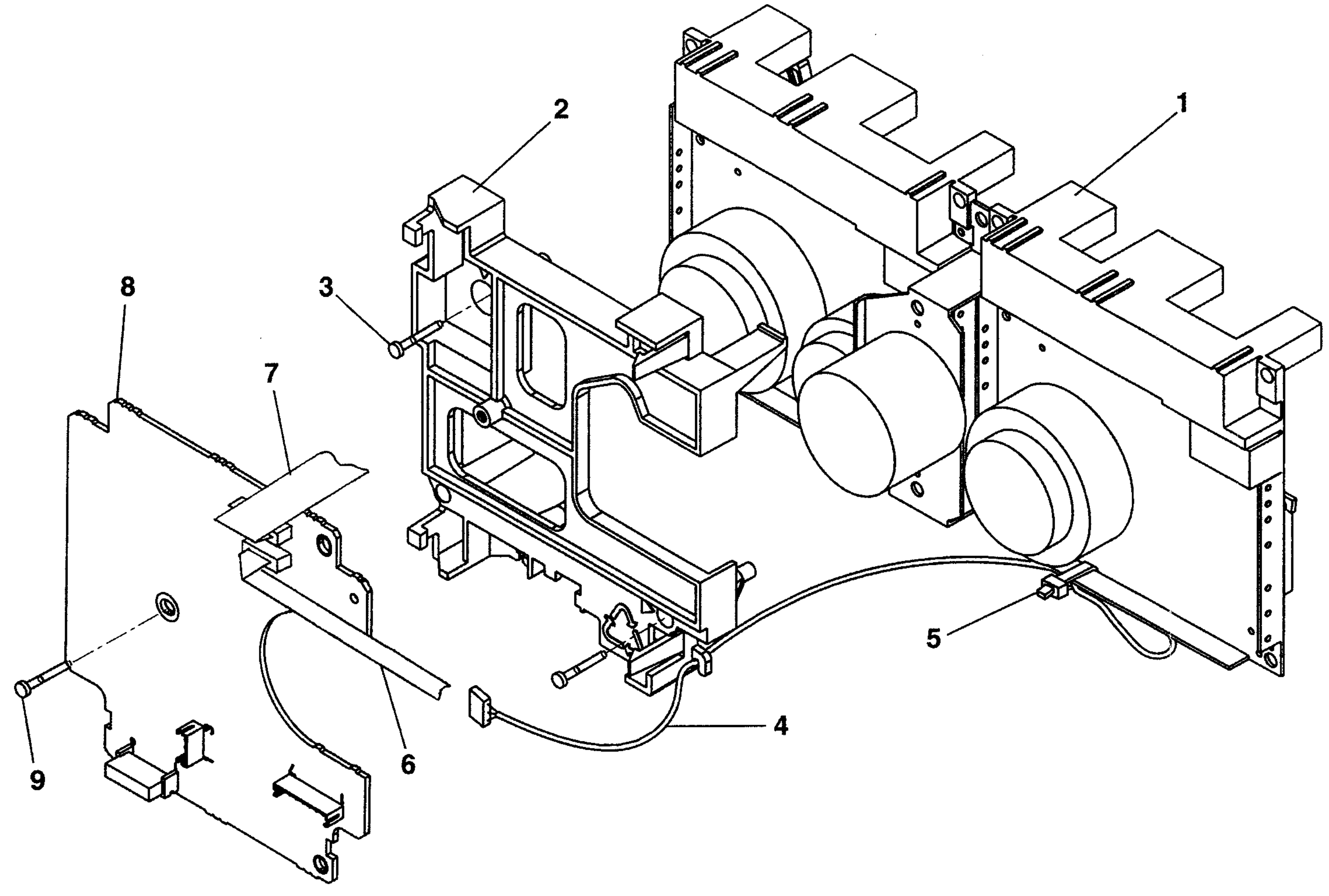

PLAY BACK DECK A
1730
REC/PB DECK B
1720
LEFT CHANNEL
RIGHT CHANNEL
7710 HEF4952B
MODE SELECTOR
7720 AN7318S
PB/REC AMPLIFIER
7740 HEF4952B
PLAYBACK EQUALISATION
7730 HEF4952B
REC EQUALISATION
CONTROL LOGIC
BIAS SYMM
PB SWITCH
BIAS LEVEL
ERASE OSCILLATOR
CLNS-2A833 YEZ
5703
TO/FROM SHEET 1
CRA
CRB
2A1
2A2
+5
HS
REC
GND_A
GND_P
GND_M
1701
7 -CMOS
6 TAPE-L
5 TAPE-R
4 +12V
3 GND_A
2 REC-L
1 REC-R
Signal path Pb left channel
Signal path REC right channel
DC Voltages measured with
Dubbing Fe to Fe
Dolby B NR OFF
EVM
# For Provision Only
ANALOG CCTRY

1701	F9
1720	C1
1730	A1
2701	B2
2702	B2
2703	A2
2704	B2
2705	A2
2706	A2
2707	A3
2708	B4
2709	A5
2710	B5
2711	A6
2712	B6
2713	A6
2714	C6
2715	A4
2716	C4
2717	C6
2718	D6
2719	C5
2720	D5
2721	C5
2722	D5
2723	D5
2724	D5
2725	D4
2726	D4
2727	A3
2728	E5
2729	A8
2730	B8
2731	A8
2732	B8
2733	A5
2734	C4
2735	B3
2737	A6
2738	B6
2741	D6
2742	C3
2743	F1
2760	E3
2761	B5
2762	B6
2763	B6
2765	B4
2769	F8
2770	F8
2780	F3
2781	F2
2782	F2
2784	F1
2785	F1
2786	D1
2787	D3
3701	B1
3702	C2
3703	A2
3704	B1
3705	A4
3706	B4
3707	A5
3708	B4
3709	A4
3710	C4
3711	A5
3712	C4
3713	A7
3714	B7
3715	A6
3716	B6
3717	C6
3718	E6
3719	C6
3720	E6
3721	C6
3722	D6
3723	A3
3724	D5
3725	C5
3726	D5
3727	A7
3728	B7
3729	A7
3730	B7
3731	A7
3732	B7
3733	A2
3734	B2
3735	A2
3736	B1
3741	A6
3742	C7
3743	F8
3744	F8
3745	E7
3746	F7
3748	C8
3749	C7
3751	E5
3752	F4
3753	F5
3754	E8
3755	E7
3756	D8
3757	D8
3758	D8
3759	D7
3760	A7
3761	E3
3762	E2
3763	A5
3764	A5
3765	B6
3766	B7
3767	B7
3768	E8
3769	E4
3770	F2
3771	F2
3772	F3
3773	E3
3774	E3
3775	F2
3776	F2
3777	F2
3778	E1
3779	D3
3780	D2
3781	D2
3782	C2
3783	D2
3784	C2
3785	C2
3786	F4
3787	C3
3788	C3
3789	F3
4790	C1
4794	C6
5701	D2
5702	D2
5703	F1
6770	E2
6771	E2
6772	E1
6773	D1
6774	D3
6775	C3
6776	F3
6777	E2
6778	E4
6782	C7
6785	A7
6786	B7
7710	A3
7720	A5
7730	D6
7740	A8
7780	F4
7781	F3
7782	E1
7783	E2
7784	D2
7785	C3
7786	C2
7787	C8
7791	F5
7792	D8
9791	A8
9792	B8
9793	A6
T100	A1
T101	A1
T102	A1
T103	C1
T105	C1
T106	C1
T107	A5
T108	B6
T109	E1
T110	E9
T111	E9
T112	F9
T113	F9
T114	E3
T115	C1
T116	E3
T117	F4
T118	C2
T119	B1
T120	A1
T121	A7
T122	B7
T123	A3
T124	E4
T125	F9

SERVO CONTROL CIRCUIT


DECK A
Gnd 6
Mode 5
Vcc 4
Sol 3
Photo 2
CR02 1
1750
T131
T133
T134
T135
T136
1703
+MOTOR
6611 1N4003
7613 BC807-25
+MOTOR
3623 100K
3625 1K
7619 BC847B
3679 47K
3613 27K
+5
3601 2K2
3603 2K2
3605 2K2
3602 27K
3604 56K
3606 120K
Rec_RVS
CRA TO 3756
BC847B 7623
3685 100K
GND_M
GND_P
2A2
HS
CRA
CRB
NS
2623 470p
2622 470p
2621 1n
STROBE 7
DATA 6
CLK 5
GND_P 4
+5 3
AD1 2
AD2 1
T139
T140
T141
T142
2624 100n
T143
T154
T155
1706
TO/FROM FRONT
NORM SPEED
HIGH SPEED
3618 8K2
3620 4K7
#3622 4K7
3616 10K
4781
7616 BC857B
6614 1N4148
3672 4K7
3674 4K7
TO 3754 3757
7622 BC847B
+MOTOR
7612 BC807-25
6612 1N4003
3628 100K
3630 47K
7618 BC847B
3678 47K
3676 47K
7614 BC807-25
3624 100K
3626 1K
7620 BC847B
3680 47K
3614 27K
TO 3669 3670 NS
TO 3690 # 4782
4783
7610 HEF4094BT
VSS
VDD
E0
STR
D
CP
Os'
Os
O3
O7
O5
O6
O4
O0
O1
O2
NS/HS
T156
MOT
2A2
TO 3740 7740 3691
SOL_B
SOL_A
TO 3786 3749 3779 6774 7730
REC
1A0
TO 3753 6782 7710 3643 3644
2A1 TO 7740
2625 100n
CRB
TO 6778 7730
3611 2K2
3609 2K2
3607 2K2
3612 56K
3610 120K
3608 27K
7624 BC847B
3686 100K
DECK B
T144 7.0V
T145 9.3V
T146
T147
T148
T149
T150
T151
T152
T153
10 L
9 H
8 Gnd
7 mode
6 Vcc
5 sol
4 photo
3 Cr02
2 Rec_F
1 Rec_RVS
1740
# For Provision Only
DC Voltages measured with Dubbing Fe to Fe Dolby B NR OFF
EVM
SERVO CONTROL CCTRY

1703	C1
1706	F1
1740	B7
1750	B1
2621	E2
2622	E2
2623	E2
2624	E2
2625	E4
3601	C2
3602	D2
3603	C2
3604	D2
3605	C2
3606	D2
3607	D6
3608	D6
3609	D6
3610	D6
3611	D6
3612	D6
3613	C2
3614	C6
3616	A5
3618	A4
3620	B4
3622	B4
3623	B3
3624	C6
3625	B3
3626	C6
3628	B5
3630	B6
3672	C4
3674	B5
3676	C5
3678	C5
3679	C3
3680	C5
3685	D2
3686	E6
4781	B5
4782	D3
4783	D3
6611	B2
6612	A6
6614	C4
7610	D4
7612	B6
7613	B3
7614	B6
7616	B4
7618	C5
7619	C3
7620	C6
7622	C5
7623	D2
7624	E6
T131	B1
T133	B1
T134	B1
T135	B1
T136	C1
T139	E1
T140	E1
T141	E1
T142	E1
T143	F2
T144	A7
T145	A7
T146	A7
T147	A7
T148	A7
T149	A7
T150	A7
T151	B7
T152	B7
T153	B7
T154	F2
T155	F2
T156	D5



ETF5 TAPE MODULE EXPLODED VIEW

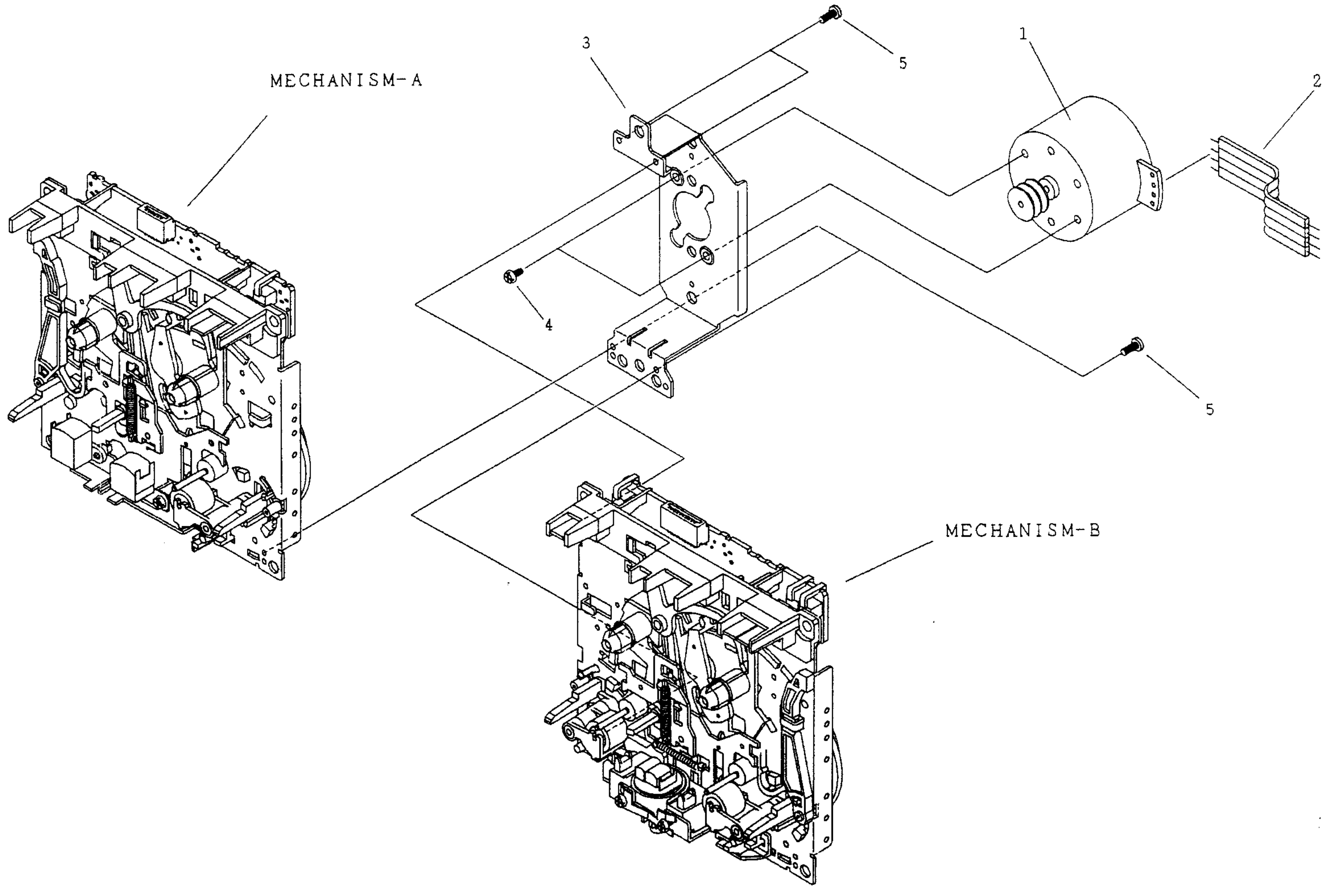
1	4822 691 10671	Tape Mechanism CWB44FR502
3	-	Screw M2 x 16
6	4822 320 12243	Flex Cable 6 pin 18 cm
7	4822 320 12242	Flex Cable 10 pin 7,5 cm
9	-	Screw D3 x 10

Note: Only the parts mentioned in this list are normal service spare parts.

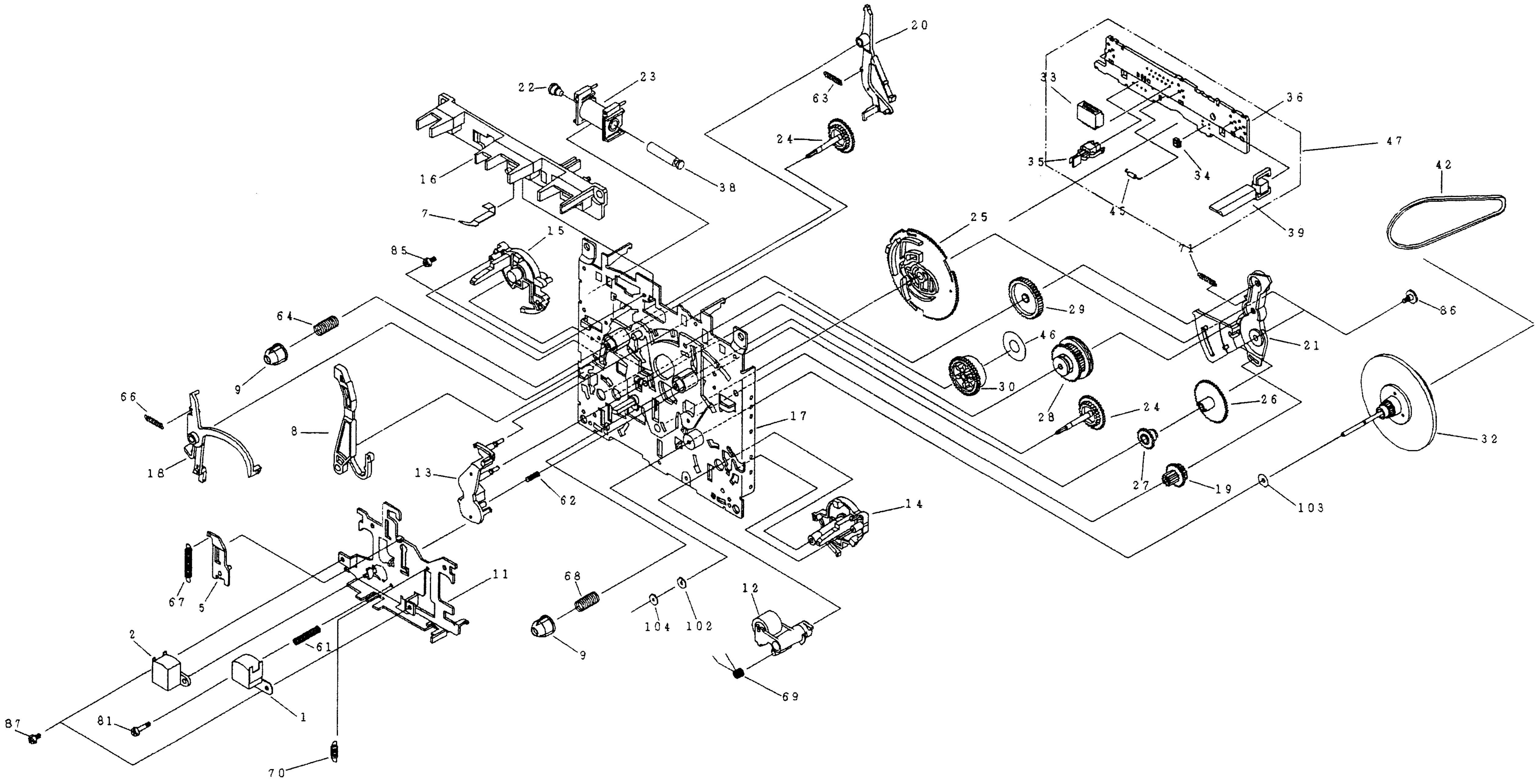
TAPE MECHANISM A & B EXPLODED VIEW

1	4822 361 10841	Motor Assembly
4	-	Screw M2,6 x 4
5	-	Screw M2 x 3

Note: Only the parts mentioned in this list are normal service spare parts.



TAPE MECHANISM A - PLAY


20
23
22
63
24
16
38
7
15
85
33
36
47
35
34
42
45
39
25
71
29
86
64
46
21
9
66
30
28
24
26
8
17
32
13
18
62
27
19
103
14
11
68
12
67
5
104
102
2
61
9
69
1
87
81
70

MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10397	MS15RAA2N1
2	4822 249 30146	Dummy Head
12	4822 528 10974	Assembly Arm Pinch R
23	4822 281 11069	Solenoid
32	4822 528 11209	Assembly Flywheel RV
33	4822 265 11207	Connector Socket 6 pin
34	4822 130 10205	Photo Sensor
35	4822 276 13946	Mode Switch
39	4822 278 90613	Leaf Switch
42	4822 358 10168	Belt AF 40mm
45	4822 050 16801	680R 1% 0,4w
69	4822 492 11542	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

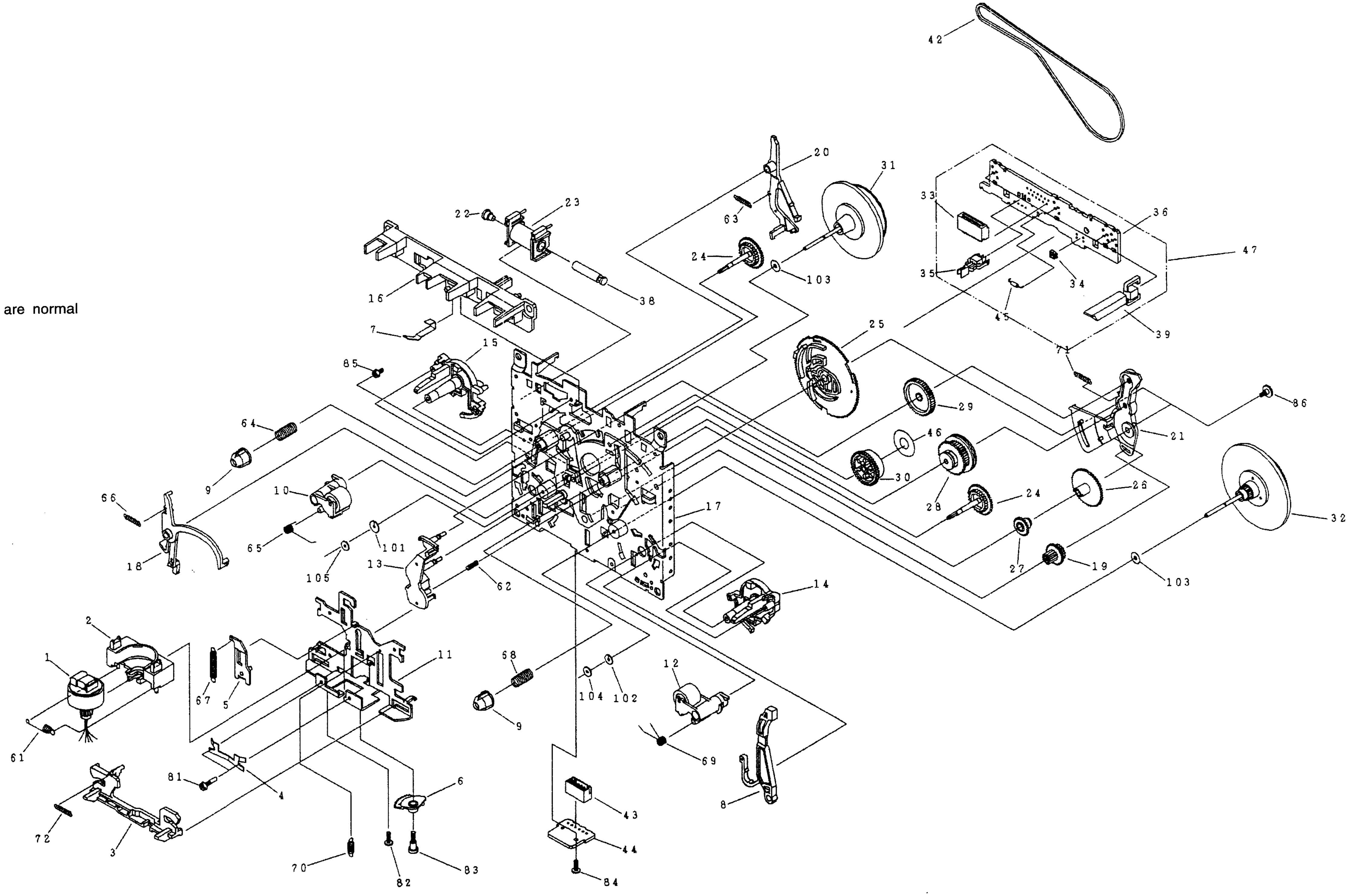
Note: Only the parts mentioned in this list are normal service spare parts.

TAPE MECHANISM B - RECORD/PLAYBACK

MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10526	Record/Playback Head
10	4822 528 10975	Assembly Arm Pinch L
12	4822 528 10974	Assembly Arm Pinch R
23	4822 281 11069	Solenoid
31	4822 528 11211	Assembly Flywheel LV
32	4822 528 11209	Assembly Flywheel RV
33	4822 265 11208	Connector Socket 10 pin
34	4822 130 10205	Photo Sensor
35	4822 276 13946	Mode Switch
39	4822 278 90613	Leaf Switch
42	4822 358 10169	Belt
45	4822 050 16801	680R 1% 0,4w
65	4822 492 11546	Spring
69	4822 492 11542	Spring
101	4822 532 12934	Washer
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer
105	4822 532 12935	Washer

Note: Only the parts mentioned in this list are normal service spare parts.


42
20
31
33
36
47
22
23
63
24
103
35
34
16
38
45
39
7
25
15
71
85
29
86
46
21
64
30
26
9
10
28
24
66
17
32
65
101
27
19
103
18
105
13
62
14
2
11
58
12
1
67
5
104
102
9
61
69
81
4
6
8
43
72
3
44
70
82
83
84

ELECTRICAL PARTS LIST - ETF5 NON-DOLBY BOARD

MISCELLANEOUS

1740	4822 267 10729	Flex connector 10 pin
1750	4822 267 10731	Flex connector 6 pin

CAPACITORS

2621	5322 122 34123	1nF 10% 50V
2622	5322 122 34099	470pF 10% 63V
2623	5322 122 34099	470pF 10% 63V
2624	4822 126 13296	100nF 10% 16V
2625	4822 126 13296	100nF 10% 16V
2701	5322 122 33538	150pF 2% 63V
2702	5322 122 33538	150pF 2% 63V
2703	5322 122 32531	100pF 5% 50V
2704	5322 122 32531	100pF 5% 50V
2705	4822 122 33575	220pF 5% 50V
2706	4822 122 33575	220pF 5% 50V
2707	5322 122 34099	470pF 10% 63V
2708	5322 122 34099	470pF 10% 63V
2709	5322 122 31863	330pF 5% 50V
2710	5322 122 31863	330pF 5% 50V
2711	5322 122 32531	100pF 5% 50V
2712	5322 122 32531	100pF 5% 50V
2713	4822 124 41579	10µF 20% 50V
2714	4822 124 41579	10µF 20% 50V
2715	4822 124 40196	220µF 20% 16V
2716	4822 124 40196	220µF 20% 16V
2717	4822 122 33177	10nF 20% 50V
2718	4822 122 33177	10nF 20% 50V
2719	4822 126 12105	33nF 5% 63V
2720	4822 126 12105	33nF 5% 63V
2721	5322 122 31866	6,8nF 10% 63V
2722	5322 122 31866	6,8nF 10% 63V
2723	4822 126 13188	15nF 5% 63V
2724	4822 126 13188	15nF 5% 63V
2725	5322 126 10223	4,7nF 10% 63V
2726	5322 126 10223	4,7nF 10% 63V
2727	5322 122 34123	1nF 10% 50V
2728	5322 122 34123	1nF 10% 50V
2729	4822 122 32541	27nF 10% 63V
2730	4822 122 32541	27nF 10% 63V
2733	5322 122 34099	470pF 10% 63V
2734	5322 122 34099	470pF 10% 63V
2735	4822 126 13296	100nF 10% 16V
2737	4822 126 13296	100nF 10% 16V
2738	4822 126 13296	100nF 10% 16V
2741	4822 126 11585	22nF+80/- 20% 25V
2742	5322 122 32654	22nF 10% 63V
2743	5322 122 32654	22nF 10% 63V
2760	4822 126 13296	100nF 10% 16V
2761	4822 124 22263	220µF 20% 25V
2762	4822 124 40246	4,7µF 20% 63V
2763	4822 124 40433	47µF 20% 25V
2765	4822 124 40433	47µF 20% 25V
2769	5322 122 34099	470pF 10% 63V
2770	5322 122 34099	470pF 10% 63V
2780	4822 124 81151	22µF 50V
2781	4822 122 33177	10nF 20% 50V
2782	5322 126 10223	4,7nF 10% 63V
2784	4822 121 51305	15nF 10% 50V
2785	4822 124 40242	1µF 20% 63V
2786	5322 122 32531	100pF 5% 50V
2787	4822 126 12105	33nF 5% 63V

RESISTORS

3601	4822 117 11449	2k2 1% 0,1W
3602	4822 051 20273	27k 5% 0,1W
3603	4822 117 11449	2k2 1% 0,1W
3604	4822 051 20563	56k 5% 0,1W
3605	4822 117 11449	2k2 1% 0,1W
3606	4822 051 20124	120k 5% 0,1W
3607	4822 116 52256	2k2 5% 0,5W
3608	4822 051 20273	27k 5% 0,1W
3609	4822 116 52256	2k2 5% 0,5W
3610	4822 051 20124	120k 5% 0,1W
3611	4822 116 52256	2k2 5% 0,5W
3612	4822 051 20563	56k 5% 0,1W
3613	4822 051 20273	27k 5% 0,1W
3614	4822 051 20273	27k 5% 0,1W
3616	4822 117 10833	10k 1% 0,1W
3618	4822 051 20822	8k2 5% 0,1W
3620	5322 100 11542	Trimmer 4k7 30% 0,1W
3623	4822 051 20104	100k 5% 0,1W
3624	4822 051 20104	100k 5% 0,1W
3625	4822 051 10102	1k 2% 0,25W
3626	4822 051 10102	1k 2% 0,25W
3628	4822 051 20104	100k 5% 0,1W
3630	4822 051 20471	470R 5% 0,1W
3672	4822 051 20472	4k7 5% 0,1W
3674	4822 116 52283	4k7 5% 0,5W
3676	4822 117 10834	47k 1% 0,1W
3678	4822 117 10834	47k 1% 0,1W
3679	4822 117 10834	47k 1% 0,1W
3680	4822 117 10834	47k 1% 0,1W
3685	4822 116 52234	100k 5% 0,5W
3686	4822 051 20104	100k 5% 0,1W
3701	4822 117 11503	220R 1% 0.1W
3702	4822 117 11503	220R 1% 0.1W
3703	4822 117 11503	220R 1% 0.1W
3704	4822 117 11503	220R 1% 0.1W
3705	4822 117 11503	220R 1% 0.1W
3706	4822 117 11503	220R 1% 0.1W
3707	4822 051 20101	100R 5% 0,1W
3708	4822 051 20101	100R 5% 0,1W
3709	4822 051 20688	6R80 5% 0,1W
3710	4822 051 20688	6R80 5% 0,1W
3711	4822 051 20154	150k 5% 0,1W
3712	4822 051 20154	150k 5% 0,1W
3713	4822 051 20109	10R 5% 0,1W
3714	4822 051 20109	10R 5% 0,1W
3715	4822 051 20182	1k8 5% 0,1W
3716	4822 051 20182	1k8 5% 0,1W
3717	4822 117 11449	2k2 1% 0,1W
3718	4822 117 11449	2k2 1% 0,1W
3719	4822 051 20472	4k7 5% 0,1W
3720	4822 051 20472	4k7 5% 0,1W
3721	4822 051 20562	5k6 5% 0,1W
3722	4822 051 20562	5k6 5% 0,1W
3723	4822 117 11383	12k 1% 0,1W
3724	4822 117 11383	12k 1% 0,1W
3725	4822 051 20109	10R 5% 0,1W
3726	4822 051 20109	10R 5% 0,1W
3727	4822 051 20562	5k6 5% 0,1W
3728	4822 051 20562	5k6 5% 0,1W
3729	4822 117 12955	2k7 1% 0,1W
3730	4822 117 12955	2k7 1% 0,1W
3731	4822 117 11507	6k8 1% 0,1W
3732	4822 117 11507	6k8 1% 0,1W
3733	4822 051 10102	1k 2% 0,25W
3734	4822 051 10102	1k 2% 0,25W
3735	4822 051 20223	22k 5% 0,1W
3736	4822 051 20223	22k 5% 0,1W
3741	4822 117 11449	2k2 1% 0,1W
3742	4822 117 11449	2k2 1% 0,1W
3743	4822 051 20122	1k2 5% 0,1W
3744	4822 051 20122	1k2 5% 0,1W
3745	4822 051 20332	3k3 5% 0,1W
3746	4822 051 20332	3k3 5% 0,1W
3748	4822 117 11449	2k2 1% 0,1W
3749	4822 117 10834	47k 1% 0,1W
3751	4822 117 10833	10k 1% 0,1W
3752	4822 051 20104	100k 5% 0,1W
3753	4822 051 20104	100k 5% 0,1W
3754	4822 051 20105	1M 5% 0,1W
3755	4822 051 20105	1M 5% 0,1W
3756	4822 051 20224	220k 5% 0,1W
3757	4822 051 20224	220k 5% 0,1W
3758	4822 117 10833	10k 1% 0,1W
3759	4822 117 10833	10k 1% 0,1W
3760	4822 051 20121	120R 5% 0,1W
3761	4822 116 83864	10k 5% 0,5W
3762	4822 117 11454	820R 1% 0,1W
3763	4822 051 20154	150k 5% 0,1W
3764	4822 116 83872	220R 5% 0,5W
3765	4822 051 20393	39k 5% 0,1W
3766	4822 051 20475	4M7 5% 0,1W
3767	4822 051 20475	4M7 5% 0,1W
3768	4822 117 10833	10k 1% 0,1W
3769	4822 117 11507	6k8 1% 0,1W
3770	4822 117 11139	1k5 1% 0,1W
3771	4822 051 20122	1k2 5% 0,1W
3772	4822 051 20822	8k2 5% 0,1W
3773	5322 100 11542	Trimmer 4k7 30% 0,1W
3774	4822 051 20822	8k2 5% 0,1W
3775	4822 051 20478	4R7 5% 0,1W
3776	4822 117 11507	6k8 1% 0,1W
3777	4822 117 10353	150R 1% 0,1W
3778	4822 052 10688 ⚠	6R8 5% 0,33W
3779	4822 051 20334	330k 5% 0,1W
3780	4822 051 20105	1M 5% 0,1W
3781	4822 051 20475	4M7 5% 0,1W
3784	4822 051 10102	1k 2% 0,25W
3786	4822 051 20223	22k 5% 0,1W
3787	4822 051 20105	1M 5% 0,1W
3788	4822 051 20105	1M 5% 0,1W
3789	4822 117 10834	47k 1% 0,1W
4701	4822 051 20008	0R Jumper 0805
4702	4822 051 20008	0R Jumper 0805
4703	4822 051 20008	0R Jumper 0805
4704	4822 051 20008	0R Jumper 0805
4705	4822 051 20008	0R Jumper 0805
4706	4822 051 20008	0R Jumper 0805
4707	4822 051 20008	0R Jumper 0805
4708	4822 051 20008	0R Jumper 0805
4709	4822 051 20008	0R Jumper 0805
4710	4822 051 20008	0R Jumper 0805
4711	4822 051 20008	0R Jumper 0805
4712	4822 051 20008	0R Jumper 0805
4713	4822 051 20008	0R Jumper 0805
4714	4822 051 20008	0R Jumper 0805
4715	4822 051 20008	0R Jumper 0805
4716	4822 051 20008	0R Jumper 0805
4717	4822 051 20008	0R Jumper 0805
4718	4822 051 20008	0R Jumper 0805
4719	4822 051 20008	0R Jumper 0805
4720	4822 051 20008	0R Jumper 0805
4721	4822 051 20008	0R Jumper 0805
4722	4822 051 20008	0R Jumper 0805
4723	4822 051 20008	0R Jumper 0805
4724	4822 051 20008	0R Jumper 0805
4725	4822 051 20008	0R Jumper 0805
4726	4822 051 20008	0R Jumper 0805
4727	4822 051 20008	0R Jumper 0805
4728	4822 051 20008	0R Jumper 0805
4729	4822 051 20008	0R Jumper 0805
4730	4822 051 20008	0R Jumper 0805
4731	4822 051 20008	0R Jumper 0805
4732	4822 051 20008	0R Jumper 0805
4733	4822 051 20008	0R Jumper 0805
4734	4822 051 20008	0R Jumper 0805

ELECTRICAL PARTS LIST - ETF5 NON-DOLBY BOARD

RESISTORS

4735	4822 051 20008	0R Jumper 0805
4736	4822 051 20008	0R Jumper 0805
4737	4822 051 20008	0R Jumper 0805
4738	4822 051 20008	0R Jumper 0805
4739	4822 051 20008	0R Jumper 0805
4740	4822 051 20008	0R Jumper 0805
4781	4822 051 20008	0R Jumper 0805
4790	4822 051 20008	0R Jumper 0805
4794	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5701	4822 156 21721	Fixed Inductor 2µ2 10%
5703	4822 156 20946	Osc Coil 100kHz

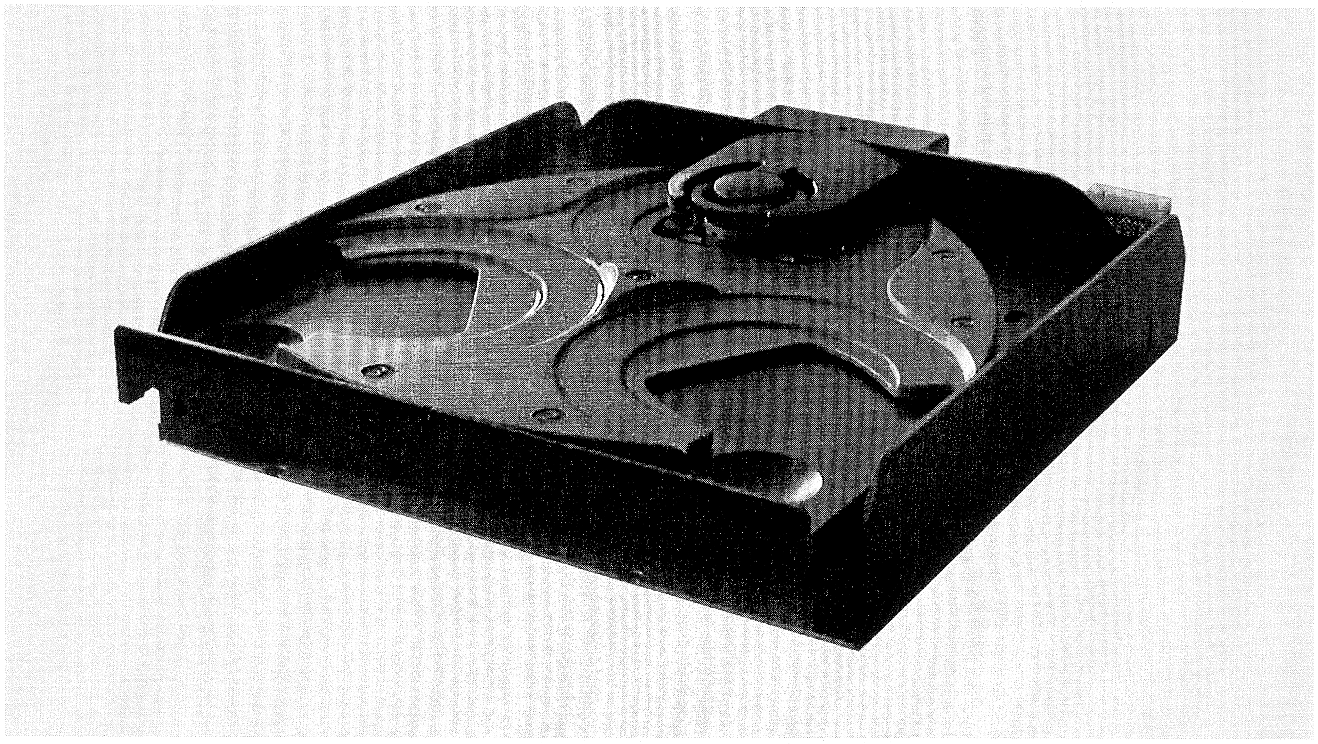
DIODES

6611	4822 130 31878	1N4003G
6612	4822 130 31878	1N4003G
6614	4822 130 30621	1N4148
6770	4822 130 30621	1N4148
6771	4822 130 30621	1N4148
6772	4822 130 30621	1N4148
6773	4822 130 30621	1N4148
6774	4822 130 30621	1N4148
6775	4822 130 30621	1N4148
6776	4822 130 30621	1N4148
6777	4822 130 34382	BZX79-B8V2
6778	4822 130 30621	1N4148
6782	4822 130 30621	1N4148
6785	4822 130 30621	1N4148
6786	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7610	5322 209 11306	HEF4094BT
7612	5322 130 60845	BC807-25
7613	5322 130 60845	BC807-25
7614	5322 130 60845	BC807-25
7616	5322 130 60508	BC857B
7618	4822 130 60511	BC847B
7619	4822 130 60511	BC847B
7620	4822 130 60511	BC847B
7622	4822 130 60511	BC847B
7623	4822 130 60511	BC847B
7624	4822 130 60511	BC847B
7710	4822 209 32919	HEF4952BT
7720	4822 209 32918	AN7318S
7730	4822 209 32919	HEF4952BT
7740	4822 209 32919	HEF4952BT
7780	4822 130 60511	BC847B
7781	4822 130 60511	BC847B
7782	4822 130 44568	BC557B
7783	4822 130 60511	BC847B
7784	5322 130 60508	BC857B
7786	4822 130 63494	J111
7787	4822 130 60511	BC847B
7791	4822 130 60511	BC847B
7792	4822 130 60511	BC847B

Note: Only the parts mentioned in this list are normal service spare parts.



3CDC Module

(3 Disc Carrousel Changer)

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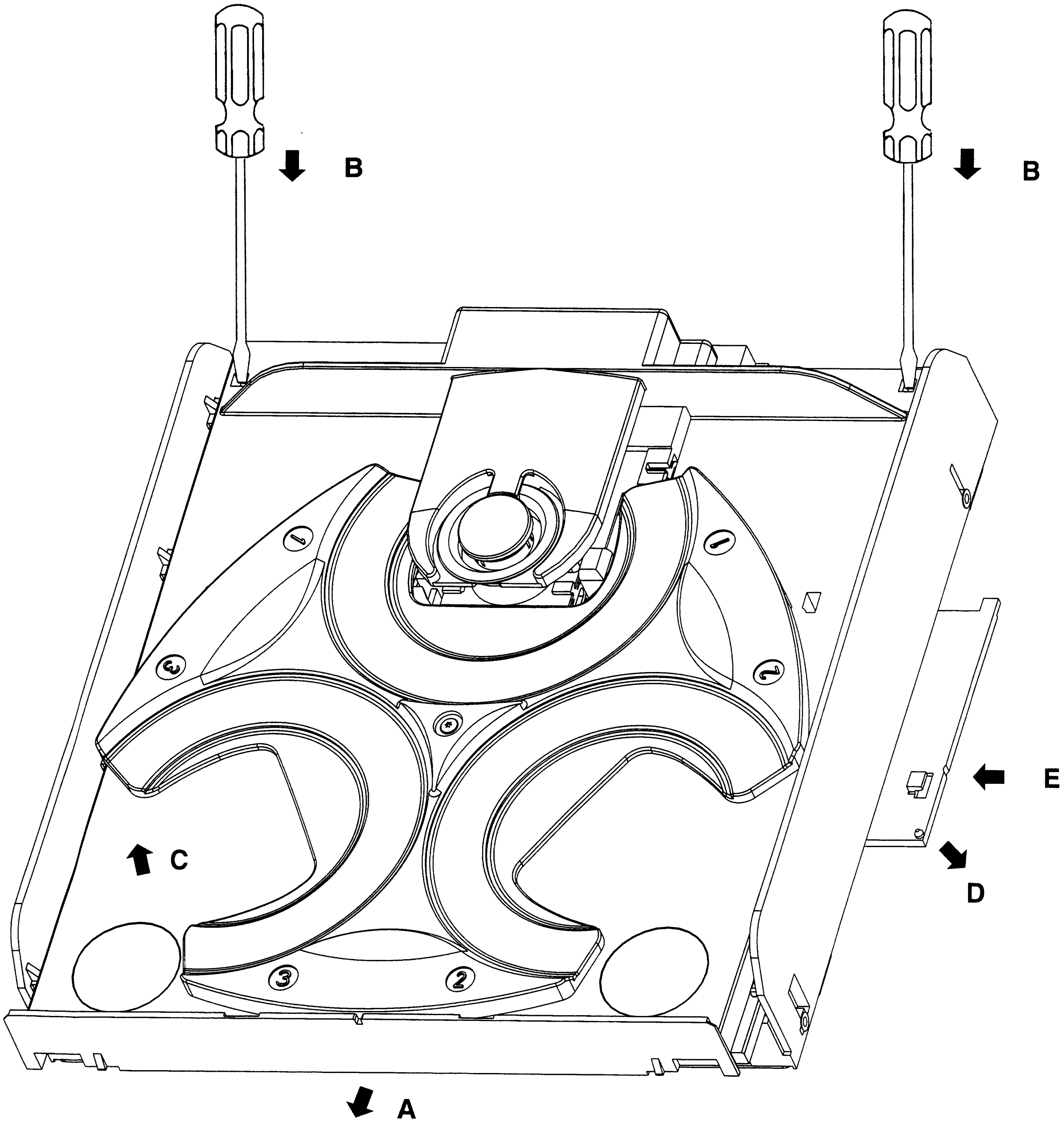
Demounting Hints



Demounting of Drawer

→ **A** Pull drawer outwards
→ **B** Unlock drawer with screwdriver
→ **C** Lift drawer to demount from chassis

Demounting of Flex Plate

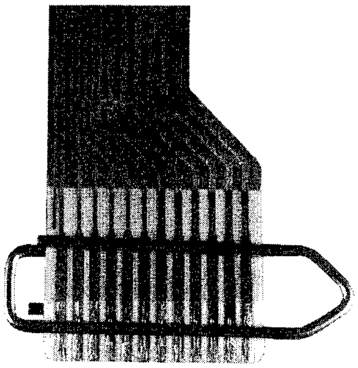
→ **D** Lift plate to unlock pin from bottom plate
→ **E** Move plate inwards to demount from bottom plate

Servicing Hints

Replacement of CD Drive

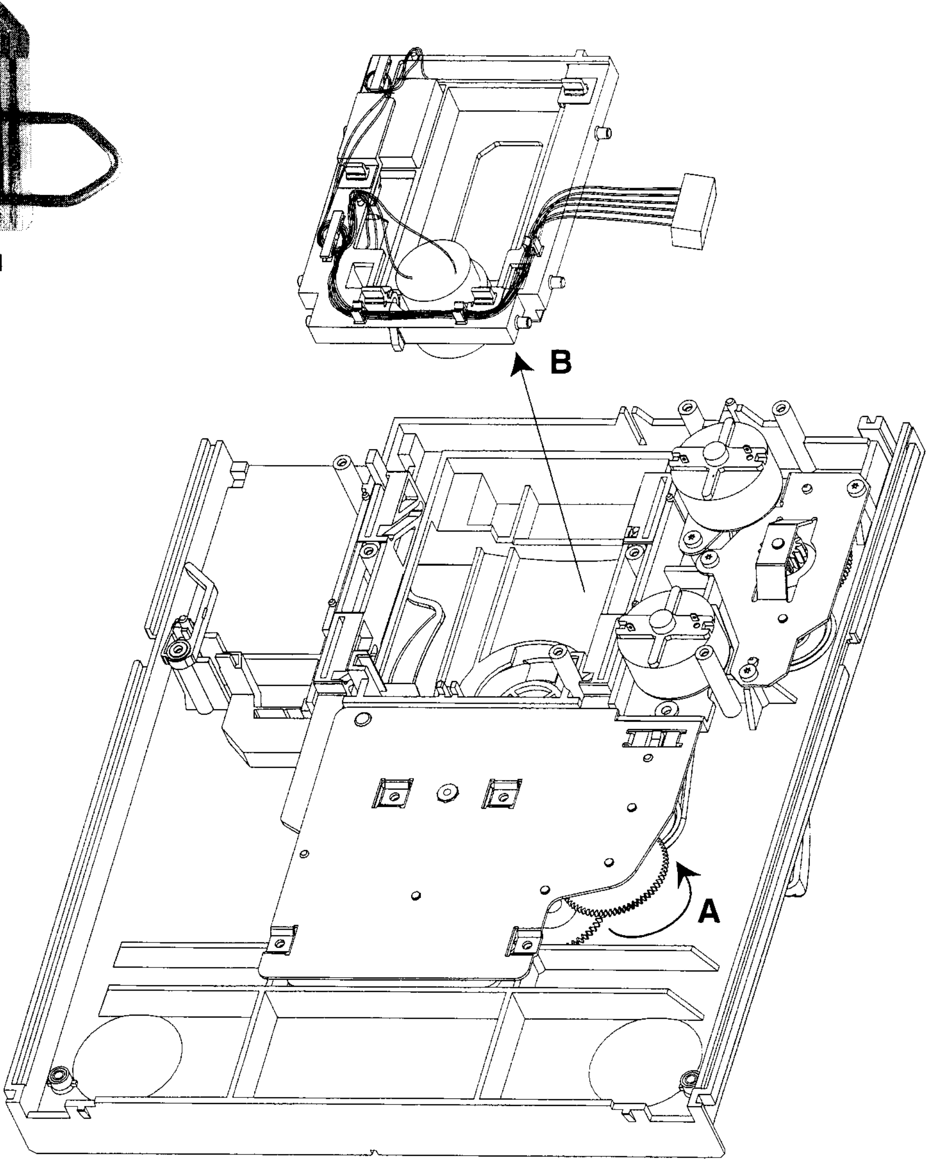
See also exploded view of changer mechanism.

1. Demount flex plate (pos 140).
2. Demount printed circuit board: remove 6 screws and desolder lips of tray motor and carrousel motor.
3. Disconnect flexfoil and JST connector of CD drive from Printed circuit board. Shortcircuit the flexfoil with a paperclip to protect the laser against ESD.



CD drive flex foil

4. Remove 2 screws (pos 107,108) and demount CD drive lockings (pos 105,106).
5. Turn gearwheel (pos 42) of disc change mechanism by finger to move CD drive support in upper position as shown in picture below Ⓐ.
6. Demount CD drive support (pos 95) Ⓑ.
7. Replace CD drive (pos 100). The wire tree of JST connector has to be desoldered and resoldered on the new CD drive again.

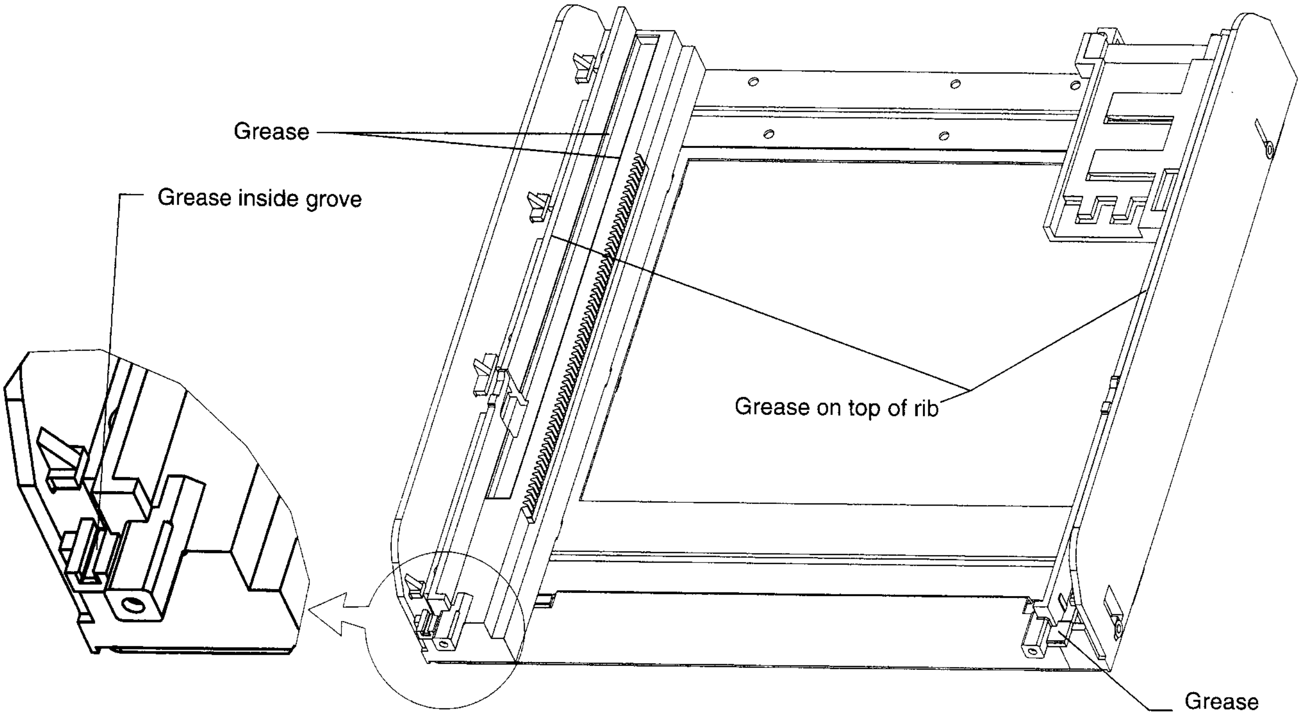


Mounting of Carrousel

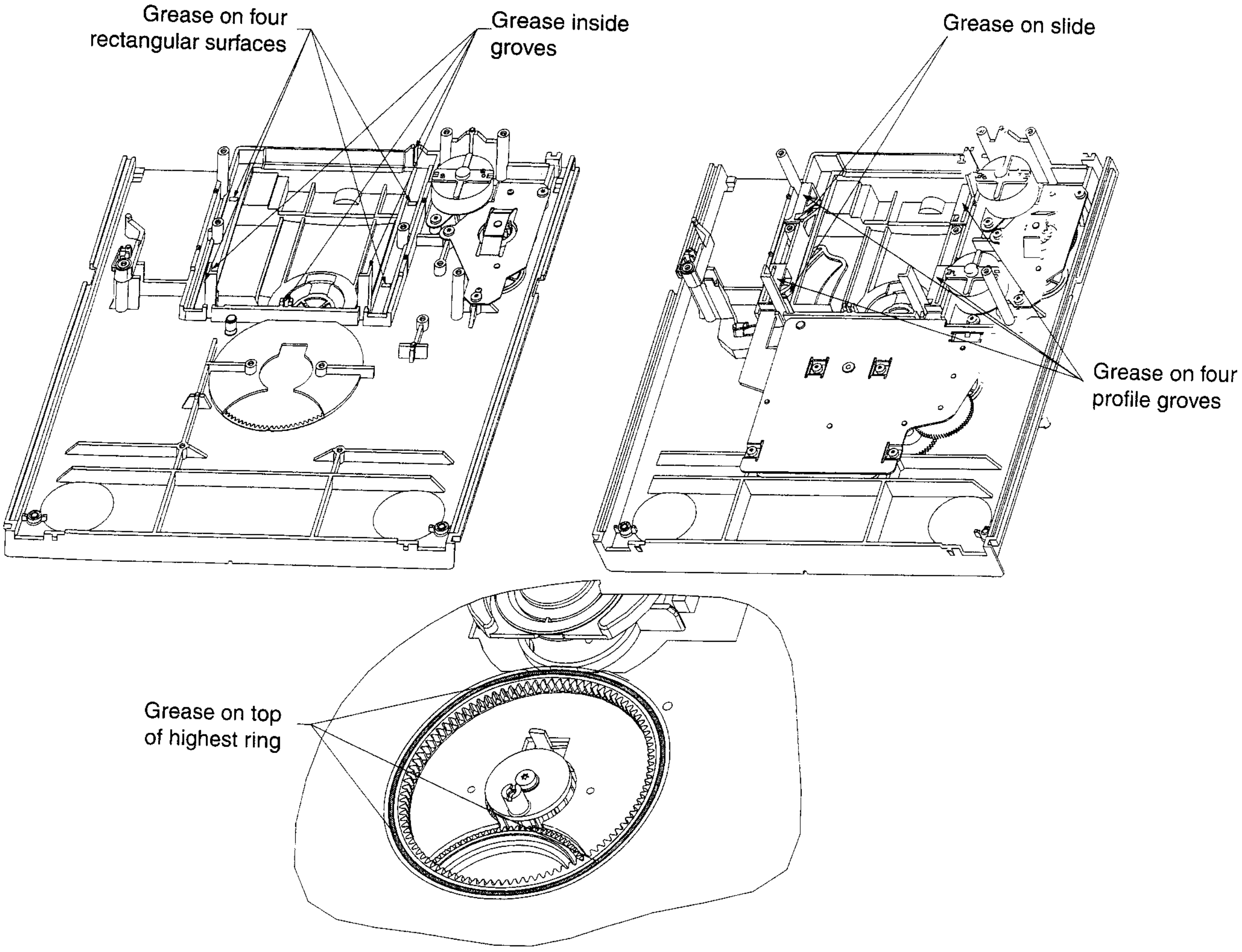
1. Turn gearwheel (pos 42) of disc change mechanism by finger until CD drive is in play position.
2. Mount carrousel (pos 115) so that disc is positioned right on turntable. Carrousel position number doesn´t matter.

Lubrication Instructions

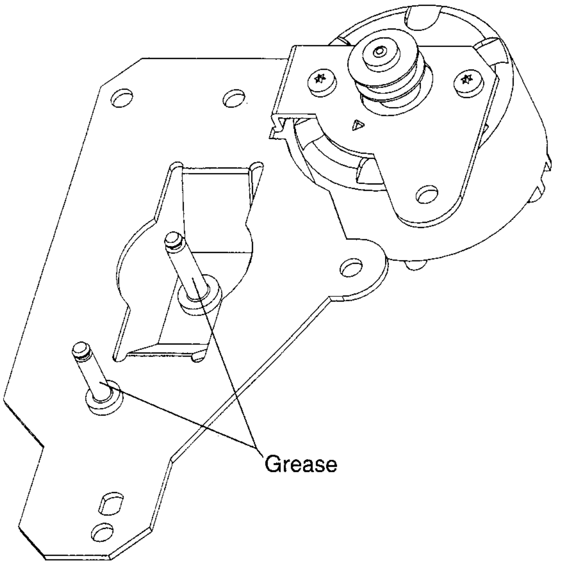
CHASSIS


Grease
Grease inside grove
Grease on top of rib
Grease

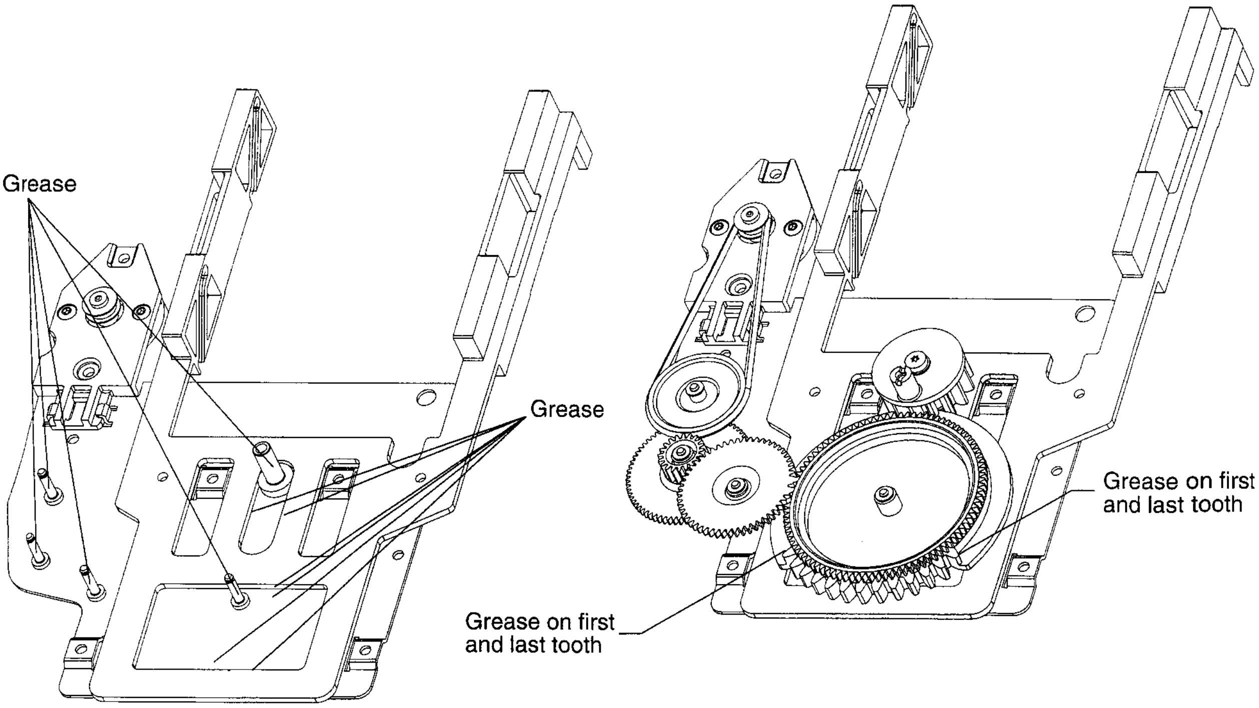
DRAWER


Grease on four rectangular surfaces
Grease inside groves
Grease on slide
Grease on four profile groves
Grease on top of highest ring

DRAWER MECHANISM



DISC CHANGE MECHANISM


Grease
Grease
Grease on first and last tooth
Grease on first and last tooth

Use only grease **Polylub GLY 801** service codenumber 4822 390 10136

WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CDM MECHANISM. THAT´S WHY, BESIDES THE SAFETY MEASURES LIKE
- ***SWITCH OFF POWER SUPPLY***
- ***ESD PROTECTION***

ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

The following steps have to be done when replacing the CDM mechanism:
1. Disconnect old CD drive flexfoil from printed board
2. Connect paperclip to CD drive flexfoil to short-circuit flexfoil (fig.1)
3. Short-circuit printed board with **brass-sheet (4822 321 11197)** plugged into the flexfoil connector (fig.2)
4. Remove old CD drive mechanism
5. Position new CD mechanism in its studs
6. Remove short-circuit from printed board connector
7. Remove short-circuit from flexfoil of new CD drive
8. Connect new flexfoil to print connector (fig.3)

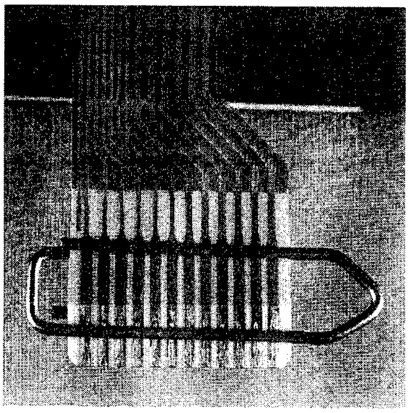


fig.1

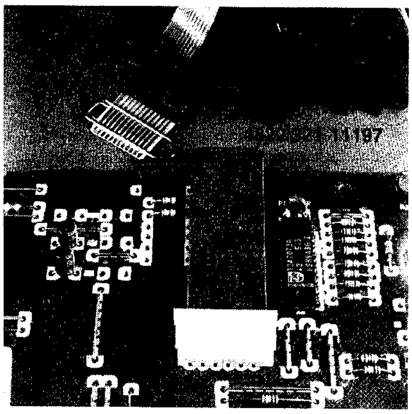


fig.2

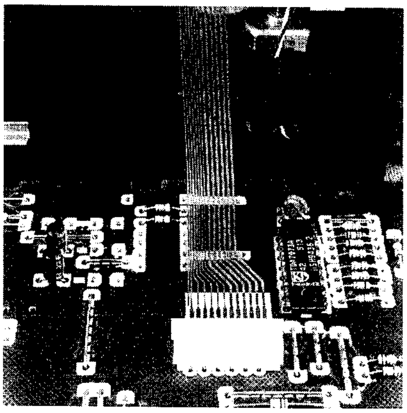
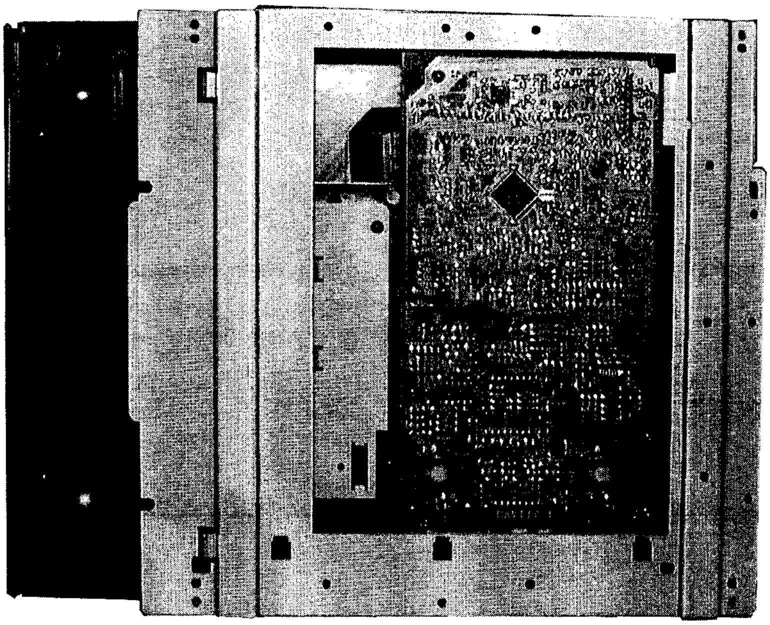


fig.3

Service Position



WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CDM MECHANISM. THAT´S WHY, BESIDES THE SAFETY MEASURES LIKE
- ***SWITCH OFF POWER SUPPLY***
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The following steps have to be done when replacing the CDM mechanism:
1. Disconnect old CD drive flexfoil from printed board
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3. Short-circuit printed board with **brass-sheet (4822 321 11197)** plugged into the flexfoil connector (fig.2)
4. Remove old CD drive mechanism
5. Position new CD mechanism in its studs
6. Remove short-circuit from printed board connector
7. Remove short-circuit from flexfoil of new CD drive
8. Connect new flexfoil to print connector (fig.3)

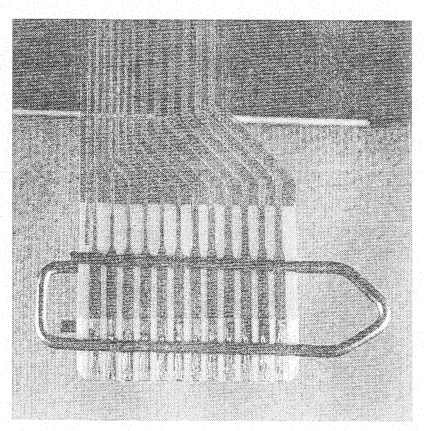


fig.1

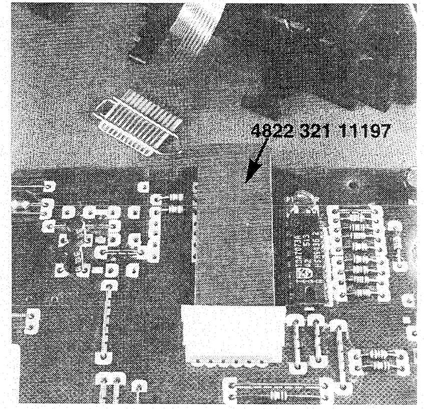


fig.2

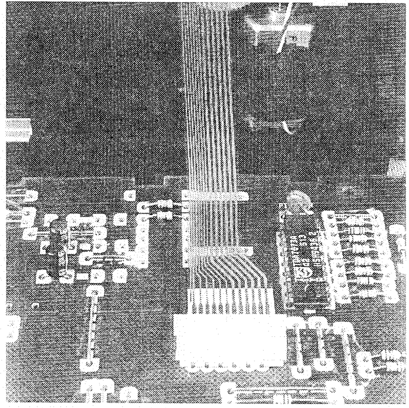
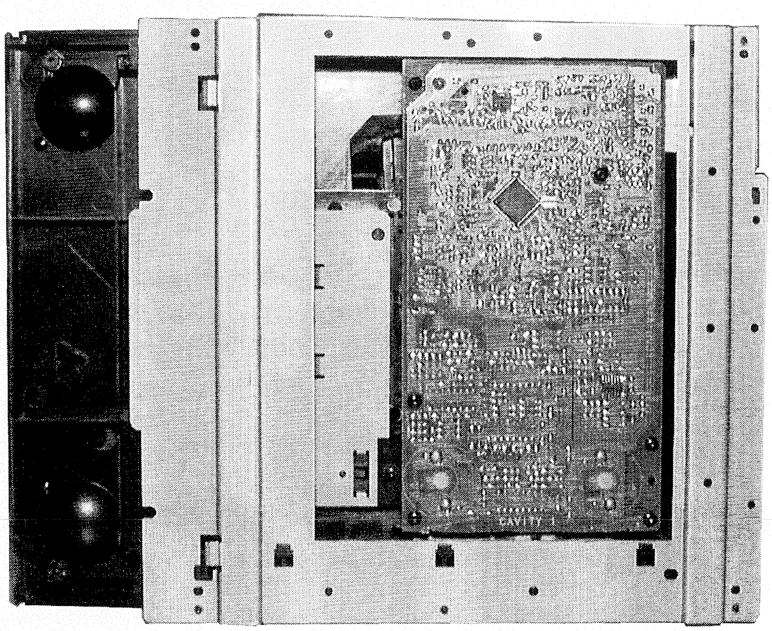
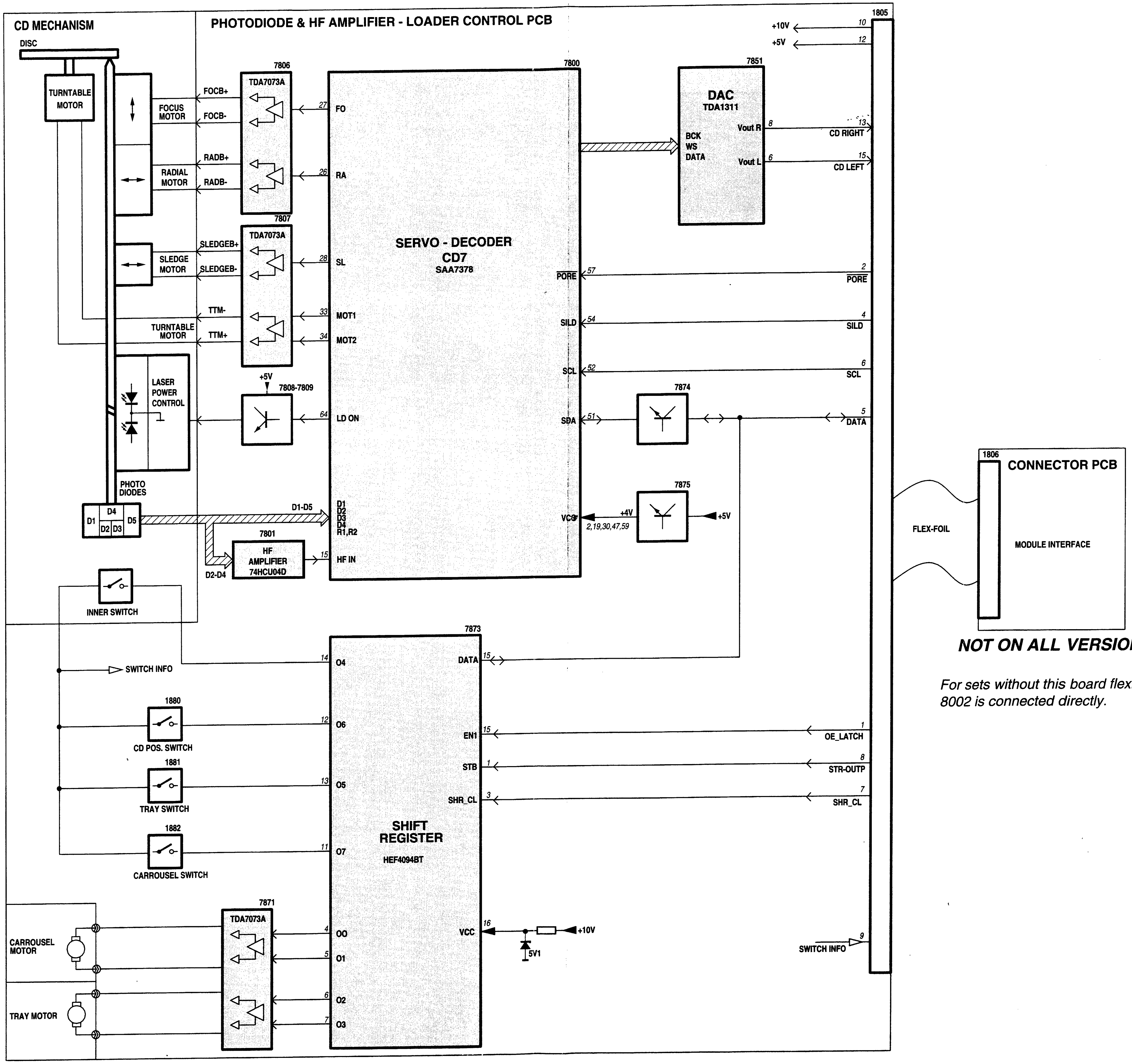


fig.3

Service Position



Blockdiagram

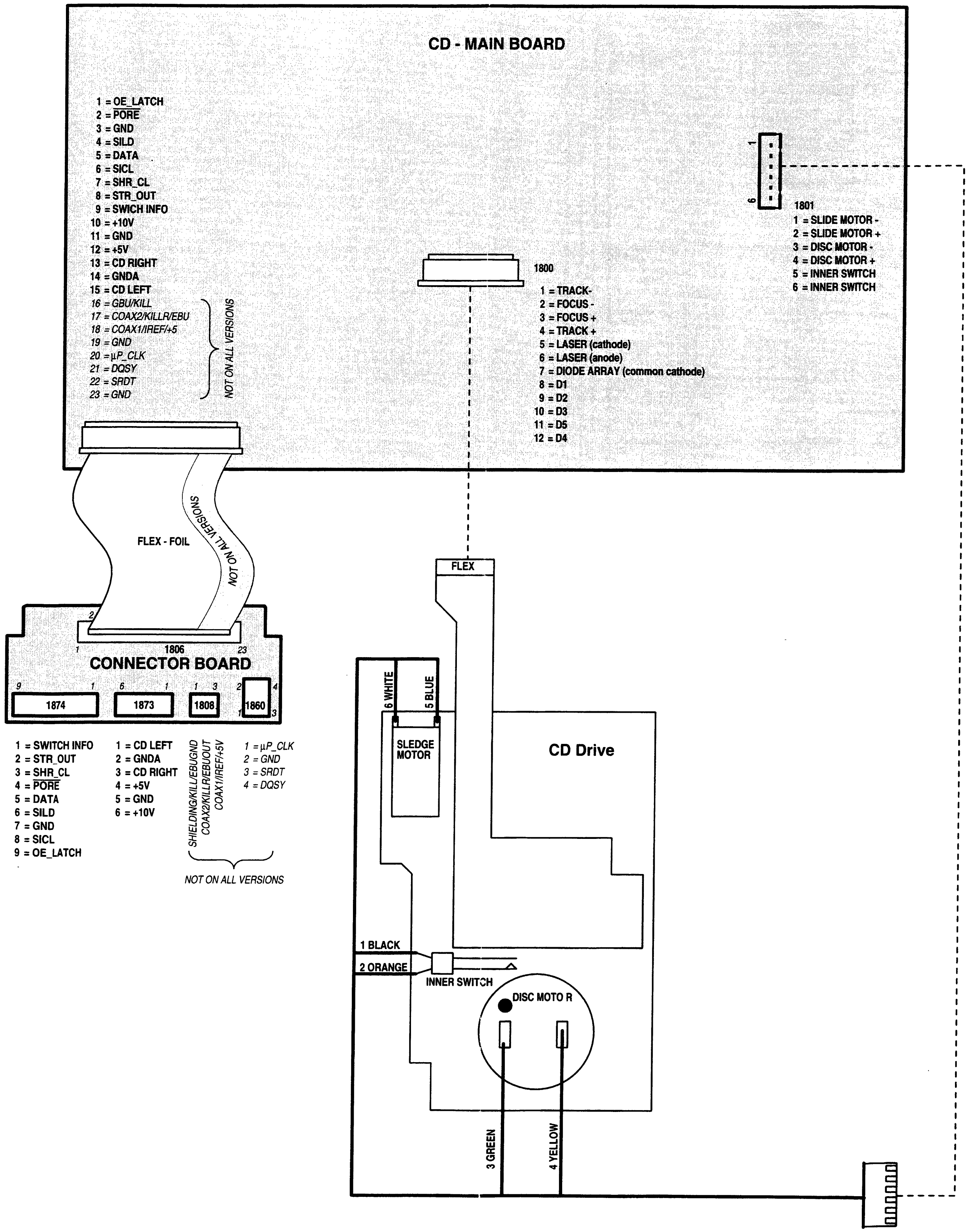

CD MECHANISM
DISC
TURNTABLE MOTOR
FOCUS MOTOR
RADIAL MOTOR
SLEDGE MOTOR
TURNTABLE MOTOR
LASER POWER CONTROL
PHOTO DIODES
D1
D4
D5
D2
D3
PHOTODIODE & HF AMPLIFIER - LOADER CONTROL PCB
FOCB+
FOCB-
RADB+
RADB-
SLEDGEB+
SLEDGEB-
TTM-
TTM+
7806
TDA7073A
7807
TDA7073A
+5V
7808-7809
D1-D5
D2-D4
7801
HF AMPLIFIER 74HCU04D
7800
SERVO - DECODER
CD7
SAA7378
27 FO
26 RA
28 SL
33 MOT1
34 MOT2
64 LD ON
D1 D2 D3 D4 R1,R2
15 HF IN
PORE 57
SILD 54
SCL 52
SDA 51
VCC 2,19,30,47,59
+4V
+5V
7874
7875
7851
DAC
TDA1311
BCK
WS
DATA
Vout R 8
Vout L 6
1805
+10V 10
+5V 12
13 CD RIGHT
15 CD LEFT
2 PORE
4 SILD
6 SCL
5 DATA
1 OE_LATCH
8 STR-OUTP
7 SHR_CL
9 SWITCH INFO
FLEX-FOIL
1806
CONNECTOR PCB
MODULE INTERFACE
INNER SWITCH
SWITCH INFO
1880
CD POS. SWITCH
1881
TRAY SWITCH
1882
CARROUSEL SWITCH
7873
SHIFT REGISTER
HEF4094BT
14 O4
12 O6
13 O5
11 O7
15 DATA
15 EN1
1 STB
3 SHR_CL
16 VCC
5V1
+10V
7871
TDA7073A
4 O0
5 O1
6 O2
7 O3
CARROUSEL MOTOR
TRAY MOTOR

NOT ON ALL VERSIONS

For sets without this board flexfoil 8002 is connected directly.

CS 53 017

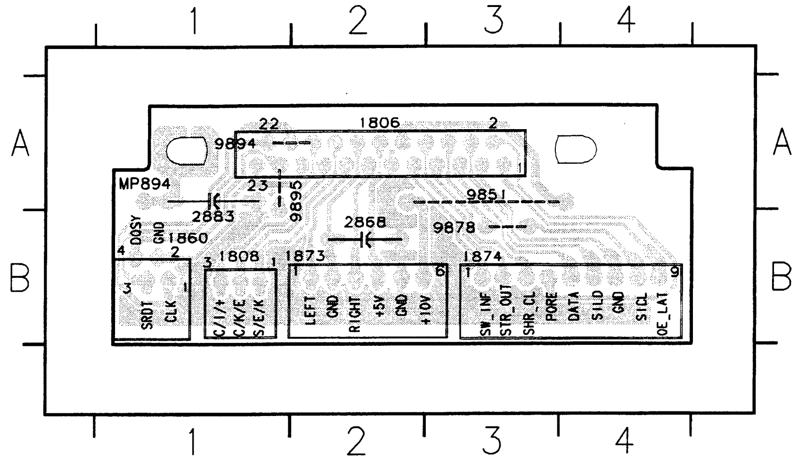
Wiring diagram


CD - MAIN BOARD
1 = OE_LATCH
2 = PORE
3 = GND
4 = SILD
5 = DATA
6 = SICL
7 = SHR_CL
8 = STR_OUT
9 = SWICH INFO
10 = +10V
11 = GND
12 = +5V
13 = CD RIGHT
14 = GNDA
15 = CD LEFT
16 = GBU/KILL
17 = COAX2/KILLR/EBU
18 = COAX1/IREF/+5
19 = GND
20 = µP_CLK
21 = DQSY
22 = SRDT
23 = GND
NOT ON ALL VERSIONS
1800
1 = TRACK-
2 = FOCUS -
3 = FOCUS +
4 = TRACK +
5 = LASER (cathode)
6 = LASER (anode)
7 = DIODE ARRAY (common cathode)
8 = D1
9 = D2
10 = D3
11 = D5
12 = D4
1
6
1801
1 = SLIDE MOTOR -
2 = SLIDE MOTOR +
3 = DISC MOTOR -
4 = DISC MOTOR +
5 = INNER SWITCH
6 = INNER SWITCH
FLEX - FOIL
NOT ON ALL VERSIONS
2
1
1806
23
CONNECTOR BOARD
9
1
6
1
1
3
2
4
1
3
1874
1873
1808
1860
1 = SWITCH INFO
2 = STR_OUT
3 = SHR_CL
4 = PORE
5 = DATA
6 = SILD
7 = GND
8 = SICL
9 = OE_LATCH
1 = CD LEFT
2 = GNDA
3 = CD RIGHT
4 = +5V
5 = GND
6 = +10V
SHIELDING/KILL/EBUGND
COAX2/KILLR/EBUOUT
COAX1/IREF/+5V
1 = µP_CLK
2 = GND
3 = SRDT
4 = DQSY
NOT ON ALL VERSIONS
FLEX
6 WHITE
5 BLUE
SLEDGE MOTOR
CD Drive
1 BLACK
2 ORANGE
INNER SWITCH
DISC MOTO R
3 GREEN
4 YELLOW

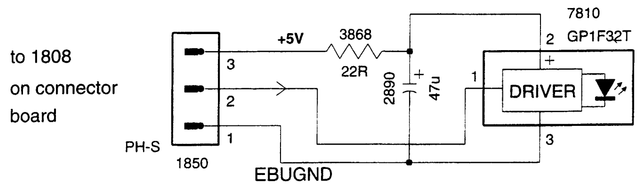
Remarks

Connector Board Copperside view

1806	A2	1873	B2	2883	B1	9894	A1
1808	B1	1874	B3	9851	A3	9895	A2
1860	B1	2868	B2	9878	B3	MP894	A1

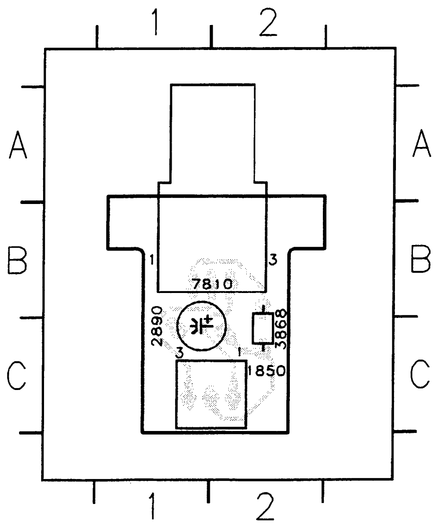

1
2
3
4
A
B
22
1806
2
9894
23
1
9895
MP894
2883
9851
2868
9878
DQSY
GND
1860
4
2
3
1808
1
1873
1
6
1874
1
9
SRDT
CLK
C/I/+
C/K/E
S/E/K
LEFT
GND
RIGHT
+5V
GND
+10V
SW_INF
STR_OUT
SHR_CL
PORE
DATA
SILD
GND
SICL
OE_LAT

Circuit Diagram Optical out


to 1808
on connector
board
PH-S
1850
3
2
1
+5V
3868
22R
2890
47u
7810
GP1F32T
2
1
DRIVER
3
EBUGND

Component Layout Optical out

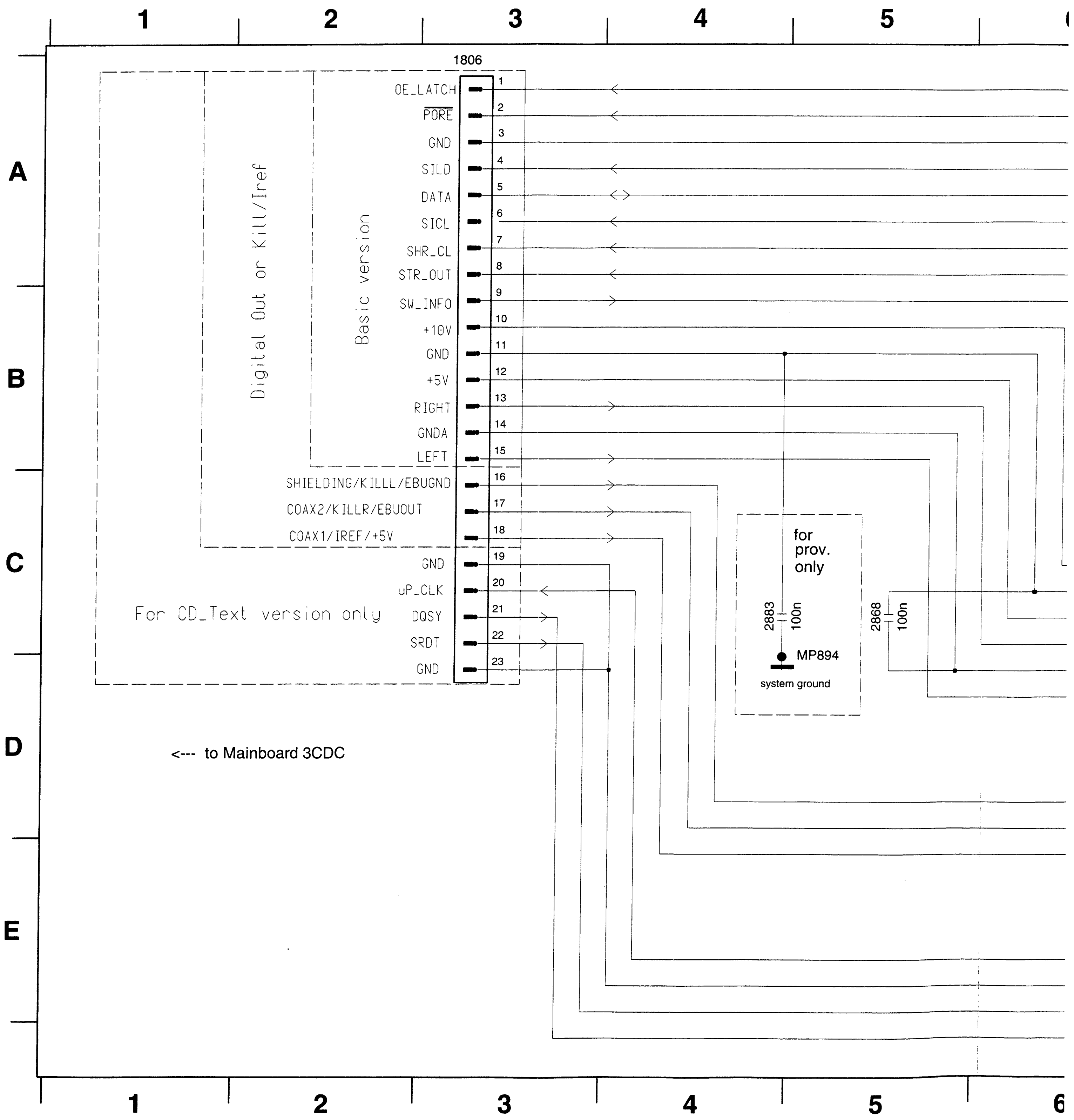
1850	C2
2890	C1
3868	C2
7810	B1


1
2
A
B
C
7810
1
3
2890
3868
3
1
1850

NOT ON ALL VERSIONS

Circuit diagram Connector Board

1806	A3	1860	E8	1874	B8	2883	C4
1808	D8	1873	D8	2868	C5		


1
2
3
4
5
A
B
C
D
E
1806
OE_LATCH
PORE
GND
SILD
DATA
SICL
SHR_CL
STR_OUT
SW_INFO
+10V
GND
+5V
RIGHT
GNDA
LEFT
SHIELDING/KILLL/EBUGND
COAX2/KILLR/EBUOUT
COAX1/IREF/+5V
GND
uP_CLK
DQSY
SRDT
GND
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
Digital Out or Kill/Iref
Basic version
For CD_Text version only
for
prov.
only
2883
100n
2868
100n
MP894
system ground
<--- to Mainboard 3CDC

NOT ON ALL VER

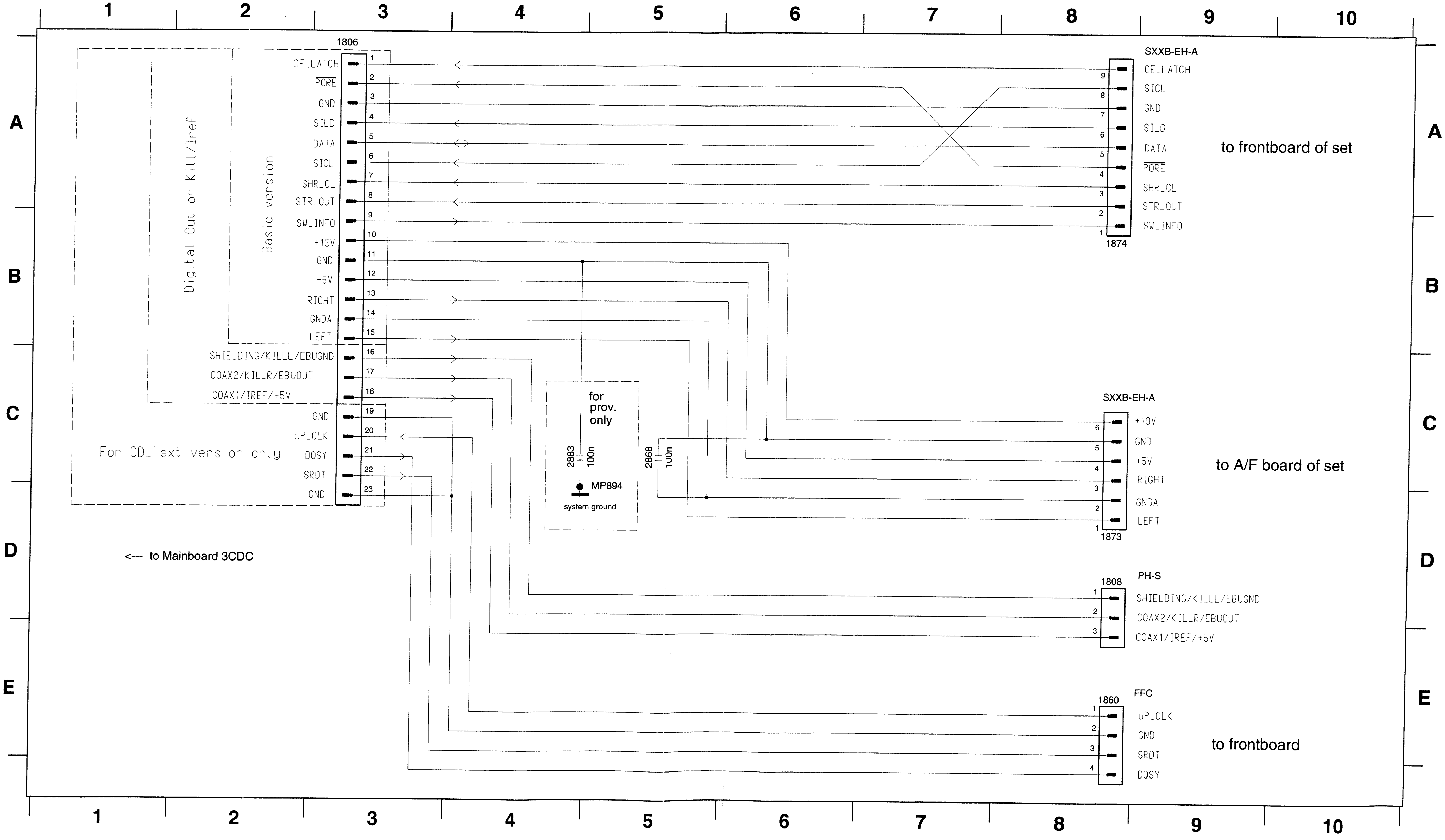
Circuit diagram Connector Board

1806	A3		1860	E8		1874	B8		2883	C4
1808	D8		1873	D8		2868	C5			

ut

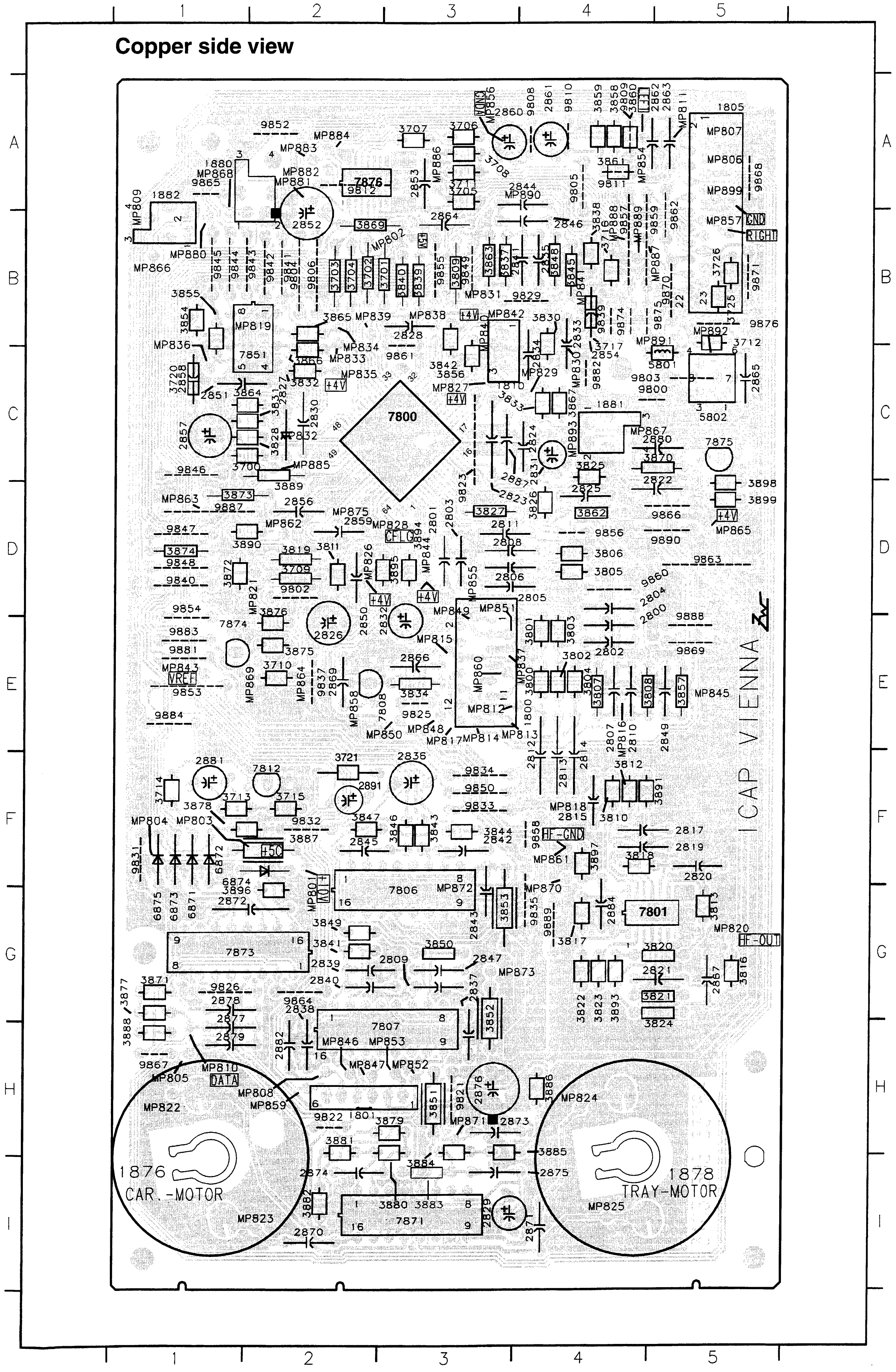
1850	C2
2890	C1
3868	C2
7810	B1

A
B
C


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
1806
OE_LATCH
PORE
GND
SILD
DATA
SICL
SHR_CL
STR_OUT
SW_INFO
+10V
GND
+5V
RIGHT
GNDA
LEFT
SHIELDING/KILLL/EBUGND
COAX2/KILLR/EBUOUT
COAX1/IREF/+5V
GND
uP_CLK
DQSY
SRDT
GND
Digital Out or Kill/Iref
Basic version
For CD_Text version only
<--- to Mainboard 3CDC
for prov. only
2883
100n
2868
100n
MP894
system ground
SXXB-EH-A
OE_LATCH
SICL
GND
SILD
DATA
PORE
SHR_CL
STR_OUT
SW_INFO
1874
to frontboard of set
SXXB-EH-A
+10V
GND
+5V
RIGHT
GNDA
LEFT
1873
to A/F board of set
1808
PH-S
SHIELDING/KILLL/EBUGND
COAX2/KILLR/EBUOUT
COAX1/IREF/+5V
1860
FFC
uP_CLK
GND
SRDT
DQSY
to frontboard

NOT ON ALL VERSIONS

Copper side view



1800	E3
1801	H2
1805	B5
1810	C3
1876	I1
1878	I4
1880	B2
1881	C4
1882	B1
2800	D4
2801	D3
2802	E4
2803	D3
2804	D4
2805	D3
2806	D3
2807	E4
2808	D3
2809	G3
2810	E4
2811	D3
2812	F4
2813	F4
2814	F4
2815	F4
2817	F4
2819	F4
2820	F5
2821	G5
2822	D5
2823	C3
2824	C4
2825	D4
2826	D2
2827	C2
2828	B3
2829	I3
2830	C2
2831	C4
2832	E3
2833	B4
2834	C3
2835	B4
2836	F3
2837	H3
2838	H2
2839	G2
2840	G2
2841	B3
2842	F3
2843	G3
2844	B4
2845	F2
2846	B4
2847	G3
2849	E5
2850	D2
2851	C1
2852	A2
2853	A3
2854	B4
2856	D2
2857	C1
2858	C1
2859	D2
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2862	A4
2863	A5
2864	B3
2865	C5
2866	E3
2867	G5
2869	E2
2870	I2
2871	I4
2872	G2
2873	H3
2874	I2
2875	I3
2876	H3
2877	G1
2878	G1
2879	H1
2880	C5
2881	F1
2882	H2
2884	G4
2887	C3
3700	C1
3701	B3
3702	B2
3703	B2
3704	B2
3705	A3
3706	A3
3707	A3
3708	A3
3709	D2
3710	E2
3711	A3
3712	B5
3713	F1
3714	F1
3715	F2
3716	B4
3717	B4
3720	C1
3725	B5
3726	B5
3800	E4
3801	E4
3802	E4
3803	E4
3804	E4
3805	D4
3806	D4
3807	E4
3808	E4
3809	B3
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3811	D2
3812	F4
3813	G5
3816	G5
3817	G4
3818	F4
3819	D2
3820	G5
3821	G5
3822	G4
3823	G4
3824	G5
3825	C4
3826	D4
3827	D3
3828	C1
3830	B4
3831	C1
3832	C2
3833	C4
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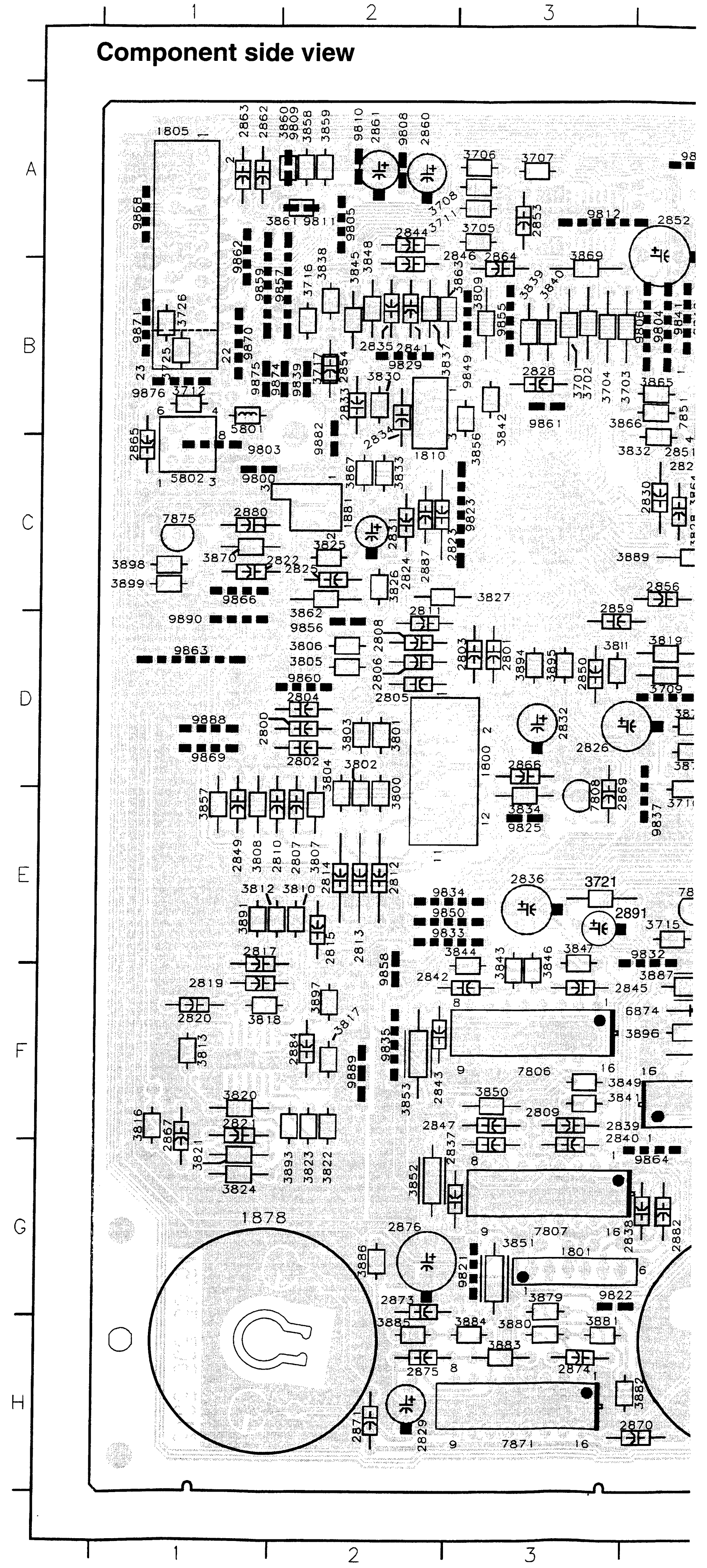
3837	B3
3838	B4
3839	B3
3840	B3
3841	G2
3842	B3
3843	F3
3844	F3
3845	B4
3846	F3
3847	F2
3848	B4
3849	G2
3850	G3
3851	H3
3852	G3
3853	G3
3854	B1
3855	B1
3856	C3
3857	E5
3858	A4
3859	A4
3860	A4
3861	A4
3862	D4
3863	B3
3864	C1
3865	B2
3866	C2
3867	C4
3869	B2
3870	C5
3871	G1
3872	D1
3873	D1
3874	D1
3875	E2
3876	E2
3877	G1
3878	F2
3879	H3
3880	H3
3881	H2
3882	I2
3883	I3
3884	H3
3885	H3
3886	H4
3887	F2
3888	H1
3889	C2
3890	D1
3891	F4
3893	G4
3894	D3
3895	D3
3896	G2
3897	F4
3898	D5
3899	D5
5801	B5
5802	C5
6871	F1
6872	F1
6873	F1
6874	F2
6875	F1
7800	C2
7801	G4
7806	G3
7807	H3
7808	E2
7812	F2
7851	B2
7871	I3
7873	G1
7874	E1
7875	C5
9800	C4
9802	D2
9803	C5
9804	B2
9805	A4
9806	B2
9808	A4
9809	A4
9810	A4
9811	A4
9812	A2
9821	H3
9822	H2
9823	C3
9825	E3
9826	G1
9829	B4
9831	F1
9832	F2
9833	F3
9834	F3
9835	G4
9837	E2
9839	B4
9840	D1
9841	B2
9842	B2
9843	B2
9844	B1
9845	B1
9846	C1
9847	D1
9848	D1
9849	B3
9850	F3
9852	A2
9853	E1
9854	D1
9855	B3
9856	D4
9857	B4
9858	F4
9859	B4
9860	D4
9861	B3
9862	B5
9863	D5
9864	G2
9865	A1
9866	D5
9867	H1
9868	A5
9869	E5
9870	B5
9871	B5
9874	B4
9875	B4
9876	B5
9881	E1
9882	C4
9883	E1
9884	E1
9887	D1
9888	E5
9889	G4
9890	D5

Component side view



1800	E3
1801	H2
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1810	C3
1876	I1
1878	I4
1880	B2
1881	C4
1882	B1
2800	D4
28[illegible]	D3
28[illegible]	E4
2[illegible]	D3
2804	D4
2805	D3
2806	D3
2807	E4
2808	D3
2809	G3
2810	E4
2811	D3
2812	F4
2813	F4
2814	F4
2815	F4
2817	F4
2819	F4
2820	F5
2821	G5
2822	D5
2823	C3
2824	C4
2825	D4
2826	D2
2827	C2
2828	B3
2829	I3
2830	C2
2831	C4
2832	E3
2833	B4
2834	C3
2835	B4
2836	F3
2837	H3
2838	H2
2839	G2
2840	G2
2841	B3
2842	F3
2843	G3
2844	B4
2845	F2
2846	B4
2847	G3
2849	E5
2850	D2
2851	C1
2852	A2
2853	A3
2854	B4
2856	D2
2857	C1
2858	C1
2859	D2
2860	A3
2861	A4
2862	A4
2863	A5
2864	B3
2865	C5
2866	E3
2867	G5
2869	E2
2870	I2
2871	I4
2872	G2
2873	H3
2874	I2
2875	I3
2876	H3
2877	G1
2878	G1
2879	H1
2880	C5
2881	F1
2882	H2
2884	G4
2887	C3
3700	C1
3701	B3
3702	B2
3703	B2
3704	B2
3705	A3
3706	A3
3707	A3
3708	A3
3709	D2
3710	E2
3711	A3
3712	B5
3713	F1
3714	F1
3715	F2
3716	B4
3717	B4
3720	C1
3725	B5
3726	B5
3800	E4
3801	E4
3802	E4
3803	E4
3804	E4
3805	D4
3806	D4
3807	E4
3808	E4
3809	B3
3810	F4
3811	D2
3812	F4
3813	G5
3816	G5
3817	G4
3818	F4
3819	D2
3820	G5
3821	G5
3822	G4
3823	G4
3824	G5
3825	C4
3826	D4
3827	D3
3828	C1
3830	B4
3831	C1
3832	C2
3833	C4
3834	E3
3837	B3
3838	B4
3839	B3
3840	B3
3841	G2
3842	B3
3843	F3
3844	F3
3845	B4
3846	F3
3847	F2
3848	B4
3849	G2
3850	G3
3851	H3
3852	G3
3853	G3
3854	B1
3855	B1
3856	C3
3857	E5
3858	A4
3859	A4
3860	A4
3861	A4
3862	D4
3863	B3
3864	C1
3865	B2
3866	C2
3867	C4
3869	B2
3870	C5
3871	G1
3872	D1
3873	D1
3874	D1
3875	E2
3876	E2
3877	G1
3878	F2
3879	H3
3880	H3
3881	H2
3882	I2
3883	I3
3884	H3
3885	H3
3886	H4
3887	F2
3888	H1
3889	C2
3890	D1
3891	F4
3893	G4
3894	D3
3895	D3
3896	G2
3897	F4
3898	D5
3899	D5
5801	B5
5802	C5
6871	F1
6872	F1
6873	F1
6874	F2
6875	F1
7800	C2
7801	G4
7806	G3
7807	H3
7808	E2
7812	F2
7851	B2
7871	I3
7873	G1
7874	E1
7875	C5
9800	C4
9802	D2
9803	C5
9804	B2
9805	A4
9806	B2
9808	A4
9809	A4
9810	A4
9811	A4
9812	A2
9821	H3
9822	H2
9823	C3
9825	E3
9826	G1
9829	B4
9831	F1
9832	F2
9833	F3
9834	F3
9835	G4
9837	E2
9839	B4
9840	D1
9841	B2
9842	B2
9843	B2
9844	B1
9845	B1
9846	C1
9847	D1
9848	D1
9849	B3
9850	F3
9852	A2
9853	E1
9854	D1
9855	B3
9856	D4
9857	B4
9858	F4
9859	B4
9860	D4
9861	B3
9862	B5
9863	D5
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9866	D5
9867	H1
9868	A5
9869	E5
9870	B5
9871	B5
9874	B4
9875	B4
9876	B5
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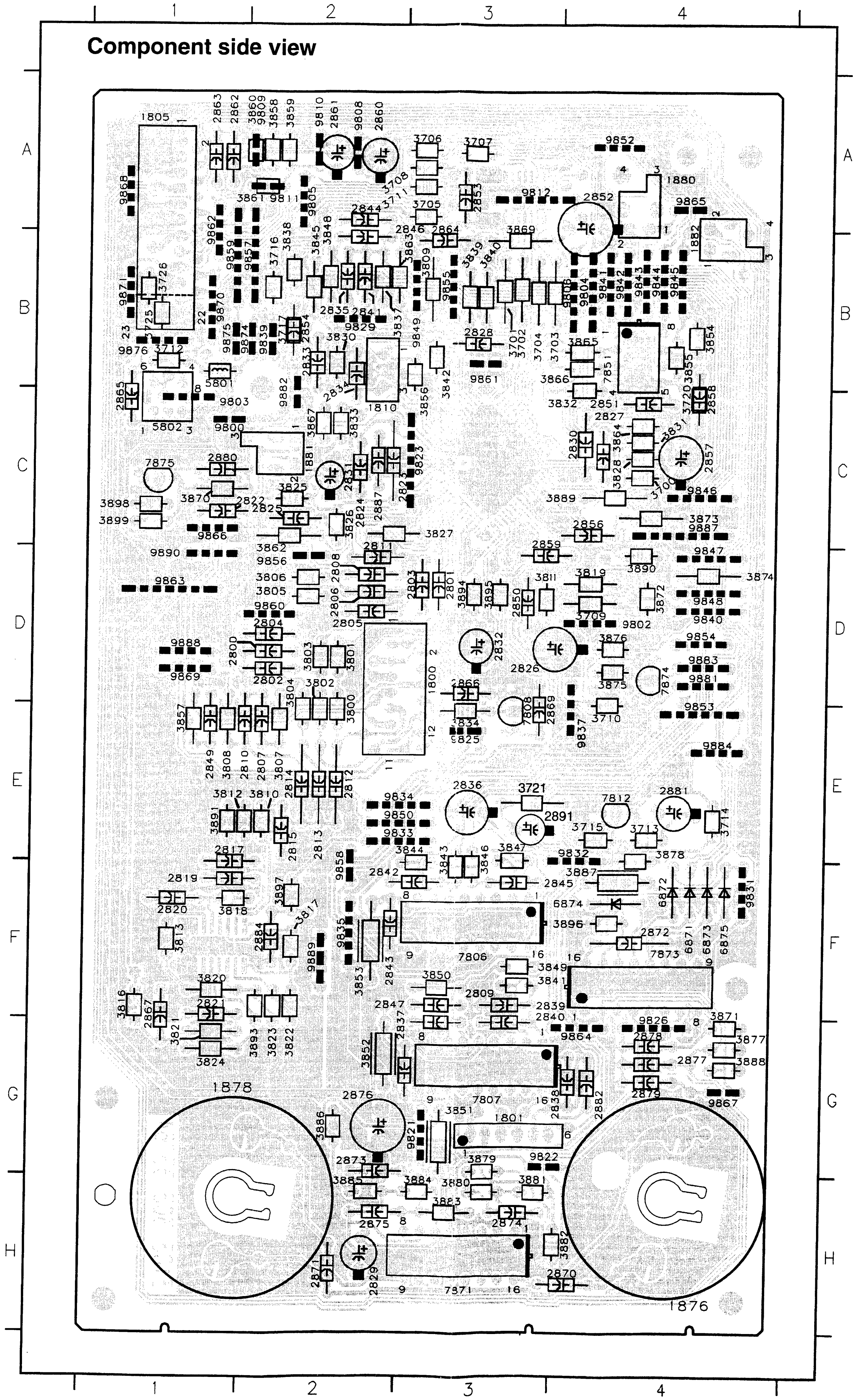
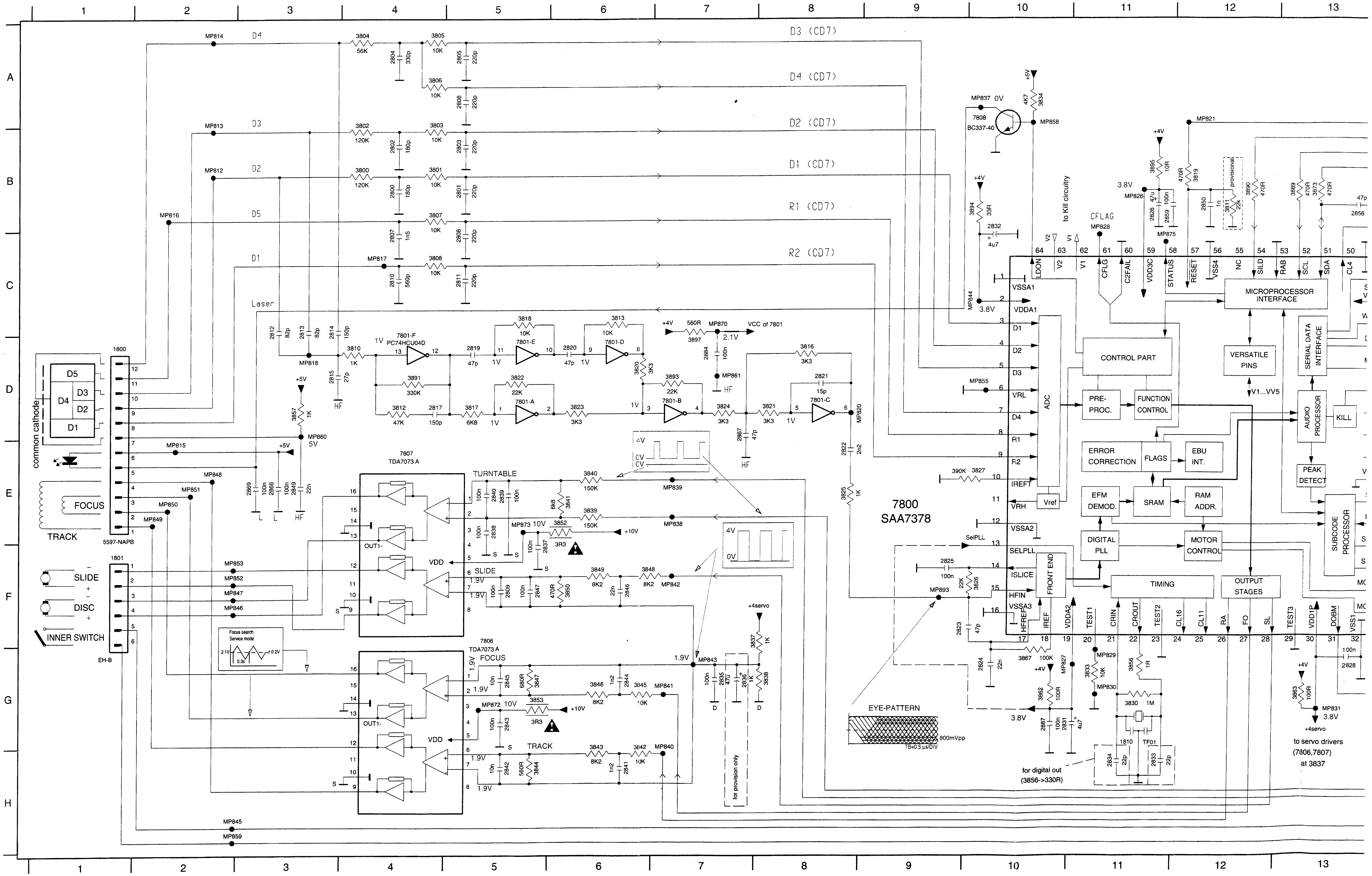
9882	C4
9883	E1
9884	E1
9887	D1
9888	E5
9889	G4
9890	D5

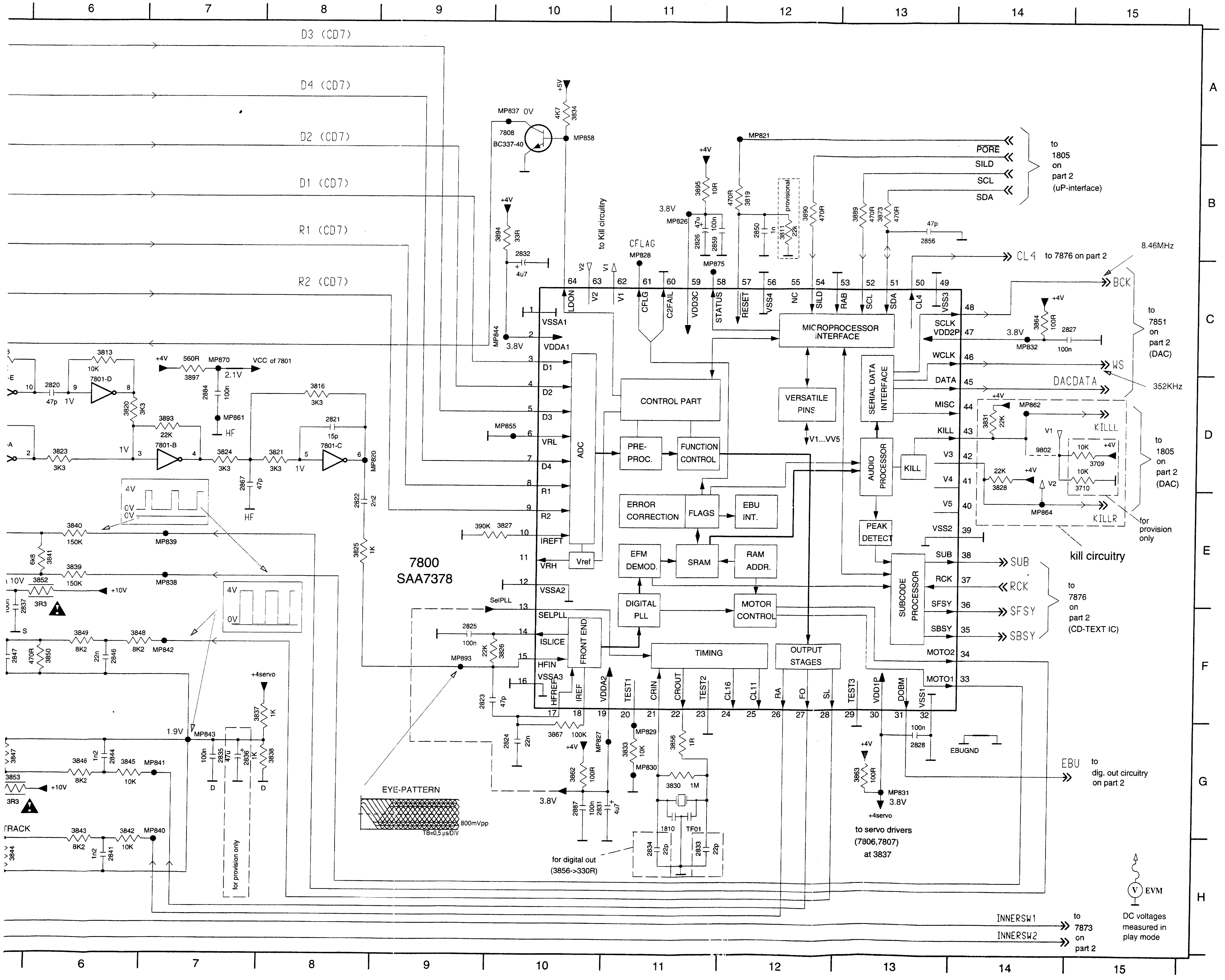


Component side view

1800	D3
1801	G3
1805	A1
1810	B2
1876	H4
1878	H1
1880	B4
1881	C2
1882	B4
2800	D2
2801	D3
2802	D2
2803	D3
2804	D2
2805	D2
2806	D2
2807	E2
2808	D2
2809	F3
2810	E2
2811	D2
2812	E2
2813	E2
2814	E2
2815	E2
2817	F1
2819	F1
2820	F1
2821	G1
2822	C1
2823	C2
2824	C2
2825	C2
2826	D3
2827	C4
2828	B3
2829	H2
2830	C4
2831	C2
2832	D3
2833	B2
2834	B2
2835	B2
2836	E3
2837	G2
2838	G4
2839	F3
2840	F3
2841	B2
2842	F3
2843	F2
2844	B2
2845	F3
2846	B2
2847	F3
2849	E1
2850	D3
2851	C4
2852	A4
2853	A3
2854	B2
2856	C4
2857	C4
2858	C4
2859	C3
2860	A2
2861	A2
2862	A1
2863	A1
2864	B3
2865	C1
2866	E3
2867	F1
2869	E3
2870	H4
2871	H2
2872	F4
2873	G2
2874	H3
2875	H2
2876	G3
2877	G4
2878	G4
2879	G4
2880	C1
2881	E4
2882	G4
2884	F2
2887	C2
3700	C4
3701	B3
3702	B3
3703	B3
3704	B3
3705	A3
3706	A3
3707	A3
3708	A3
3709	D4
3710	E4
3711	A3
3712	B1
3713	E4
3714	E4
3715	E4
3716	B2
3717	B2
3720	C4
3725	B1
3726	B1
3800	E2
3801	D2
3802	E2
3803	D2
3804	E2
3805	D2
3806	D2
3807	E2
3808	E1
3809	B3
3810	E2
3811	D3
3812	E2
3813	F1
3816	F1
3817	F2
3818	F1
3819	D4
3820	F1
3821	G1
3822	F2
3823	F2
3824	G1
3825	C2
3826	C2
3827	C2
3828	C4
3830	B2
3831	C4
3832	C4
3833	C2
3834	E3
3837	B2
3838	B2
3839	B3
3840	B3
3841	F3
3842	B3
3843	F3
3844	F3
3845	B2
3846	F3
3847	E3
3848	B2
3849	F3
3850	F3
3851	G3
3852	G2
3853	F2
3854	B4
3855	B4
3856	B3
3857	E1
3858	A2
3859	A2
3860	A2
3861	A2
3862	C2
3863	B2
3864	C4
3865	B4
3866	B4
3867	C2
3869	B3
3870	C1
3871	G4
3872	D4
3873	C4
3874	D4
3875	D4
3876	D4
3877	G4
3878	E4
3879	G3
3880	H3
3881	H3
3882	H4
3883	H3
3884	H3
3885	H2
3886	G2
3887	F4
3888	G4
3889	C4
3890	D4
3891	E1
3893	F2
3894	D3
3895	D3
3896	F4
3897	F2
3898	C1
3899	C1
5801	B1
5802	C1
6871	F4
6872	F4
6873	F4
6874	F4
6875	F4
7806	F3
7807	G3
7808	E3
7812	E4
7851	B4
7871	H3
7873	F4
7874	D4
7875	C1
9800	C1
9802	D4
9803	C1
9804	B4
9805	A2
9806	B4
9808	A2
9809	A2
9810	A2
9811	A2
9812	A3
9821	G3
9822	G3
9823	C3
9825	E3
9826	G4
9829	B2
9831	F4
9832	E4
9833	E2
9834	E2
9835	F2
9837	E4
9839	B2
9840	D4
9841	B4
9842	B4
9843	B4
9844	B4
9845	B4
9846	C4
9847	D4
9848	D4
9849	B3
9850	E2
9852	A4
9853	E4
9854	D4
9855	B3
9856	D2
9857	B2
9858	F2
9859	B1
9860	D2
9861	B3
9862	A1
9863	D1
9864	G4
9865	A4
9866	C1
9867	G4
9868	A1
9869	D1
9870	B1
9871	B1
9874	B2
9875	B1
9876	B1
9881	D4
9882	C2
9883	D4
9884	E4
9887	C4
9888	D1
9889	F2
9890	D1

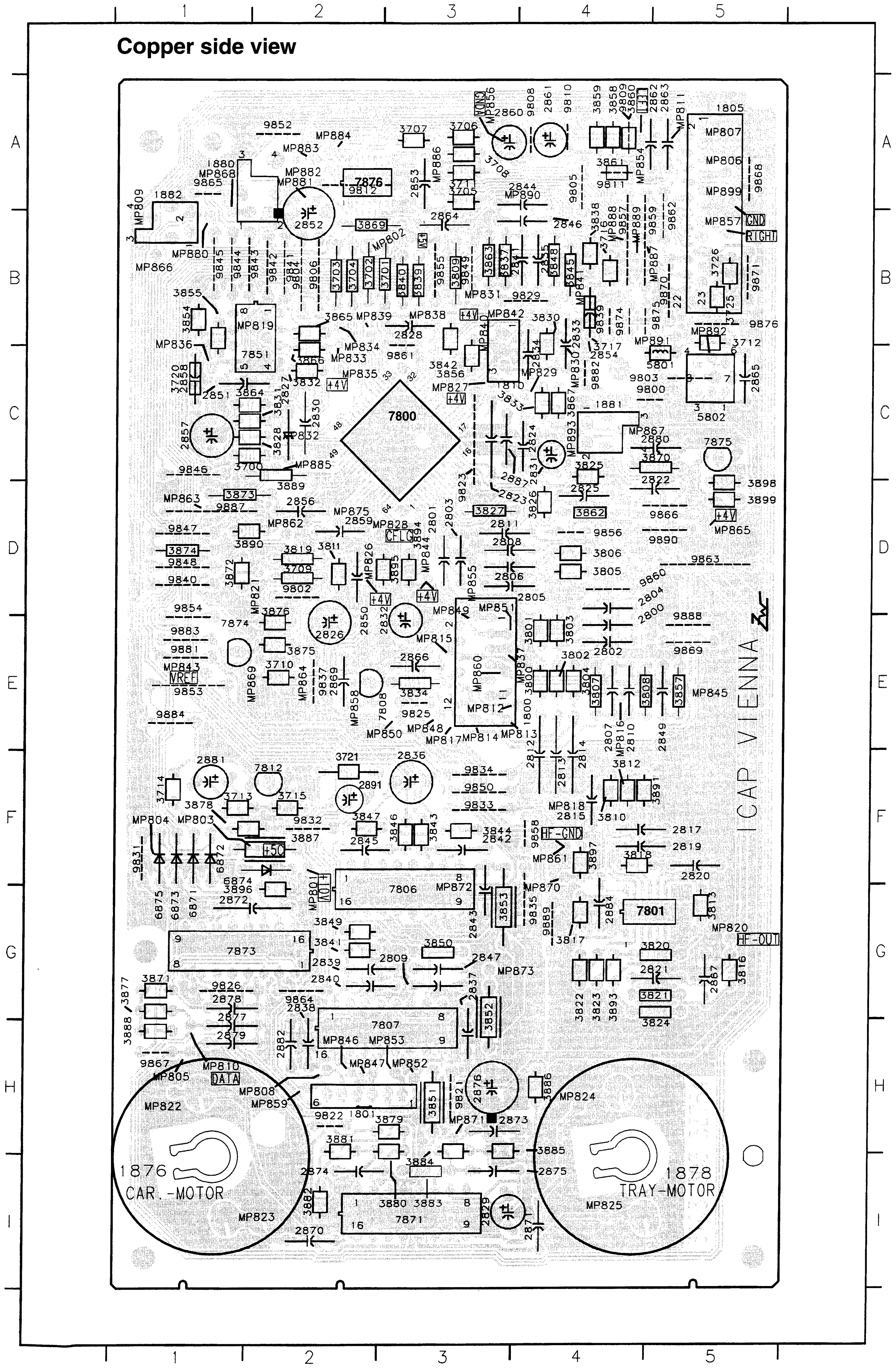
Circuit Diagram Main Board part1


1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
MP814
D4
3804
56K
2804
330p
3805
10K
2805
220p
3806
10K
2806
220p
D3 (CD7)
D4 (CD7)
D2 (CD7)
D1 (CD7)
R1 (CD7)
R2 (CD7)
MP813
D3
3802
120K
2802
180p
3803
10K
2803
220p
MP812
D2
3800
120K
2800
180p
3801
10K
2801
220p
MP816
D5
3807
10K
2807
1n5
2809
220p
D1
MP817
3808
10K
2810
560p
2811
220p
Laser
2812
82p
2813
82p
2814
150p
MP818
3810
1K
2815
27p
HF
1V
7801-F
PC74HCU04D
13
12
3891
330K
3812
47K
2817
150p
3817
6K8
2819
47p
3818
10K
7801-E
11
10
2820
47p
9
7801-D
8
3813
10K
3822
22K
7801-A
1
2
3823
3K3
3820
3K3
3893
22K
7801-B
3
4
+4V
560R
3897
MP870
2.1V
VCC of 7801
2884
100n
MP861
3816
3K3
2821
15p
7801-C
5
6
3824
3K3
3821
3K3
2867
47p
MP820
2822
2n2
3825
1K
+5V
3857
1K
MP860
5V
1800
D5
D4
D3
D2
D1
common cathode
FOCUS
TRACK
5597-NAPB
MP815
+5V
MP848
MP851
MP850
MP849
2869
100n
2866
100n
2849
22n
L
L
HF
7807
TDA7073 A
16
15
14
13
12
11
10
9
OUT1-
VDD
TURNTABLE
3840
150K
MP839
3839
150K
MP838
2840
100n
2839
100n
6K8
3841
MP873
10V
3852
3R3
+10V
2838
100n
2837
100n
S
SLIDE
1.9V
3849
8K2
3848
8K2
MP842
2809
100n
2847
100n
470R
3850
22n
2846
4V
CV
0V
1801
SLIDE
DISC
INNER SWITCH
EH-B
MP853
MP852
MP847
MP846
Focus search
Service mode
2.1V
0.3s
+0.2V
7806
TDA7073 A
FOCUS
2845
10n
680R
3847
3846
8K2
1n2
2844
3845
10K
MP841
MP872
10V
3853
3R3
+10V
2843
100n
TRACK
3843
8K2
3842
10K
MP840
2842
10n
560R
3844
1n2
2841
MP843
+4servo
3837
1K
2835
100n
2836
47u
1K
3838
D
for provision only
MP845
MP859
+5V
4K7
3834
MP837
0V
7808
BC337-40
MP858
to Kill circuitry
+4V
3894
33R
2832
4u7
MP844
3.8V
V2
V1
CFLAG
MP828
3.8V
MP826
+4V
3895
10R
2826
47u
2859
100n
MP875
470R
3819
MP821
2850
1n
3811
22k
provisional
3890
470R
3889
470R
3873
470R
47p
2856
64
63
62
61
60
59
58
57
56
55
54
53
52
51
50
LDON
V2
V1
CFLG
C2FAIL
VDD3C
STATUS
RESET
VSS4
NC
SILD
RAB
SCL
SDA
CL4
VSSA1
VDDA1
D1
D2
D3
VRL
D4
R1
R2
IREFT
VRH
VSSA2
SELPLL
ISLICE
HFIN
VSSA3
HFREF
ADC
Vref
MICROPROCESSOR INTERFACE
CONTROL PART
VERSATILE PINS
V1...VV5
SERIAL DATA INTERFACE
PRE-PROC.
FUNCTION CONTROL
AUDIO PROCESSOR
KILL
ERROR CORRECTION
FLAGS
EBU INT.
PEAK DETECT
EFM DEMOD.
SRAM
RAM ADDR.
SUBCODE PROCESSOR
DIGITAL PLL
MOTOR CONTROL
FRONT END
TIMING
OUTPUT STAGES
7800
SAA7378
MP855
390K
3827
SelPLL
2825
100n
22K
3826
MP893
2823
47p
IREF
VDDA2
TEST1
CRIN
CROUT
TEST2
CL16
CL11
RA
FO
SL
TEST3
VDD1P
DOBM
VSS1
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
2824
22n
3867
100K
+4V
MP827
3833
10K
MP829
MP830
3856
1R
3862
100R
2887
100n
2831
4u7
3.8V
3830
1M
1810
TF01
2834
22p
2833
22p
for digital out
(3856->330R)
EYE-PATTERN
800mVpp
TB=0.5 µs/DIV
100n
2828
+4V
3863
100R
MP831
3.8V
+4servo
to servo drivers
(7806,7807)
at 3837


D3 (CD7)
D4 (CD7)
D2 (CD7)
D1 (CD7)
R1 (CD7)
R2 (CD7)
7800
SAA7378
MP837 0V
7808
BC337-40
+5V
4K7
3834
MP858
to Kill circuitry
+4V
3894
33R
2832
4u7
MP844
3.8V
CFLAG
MP828
3.8V
MP826
3895
10R
2826 47u
2859 100n
MP875
MP821
470R
3819
2850 1n
3811 22k
provisional
3890 470R
3889 470R
3873 470R
47p
2856
PORE
SILD
SCL
SDA
to 1805 on part 2 (uP-interface)
CL4 to 7876 on part 2
8.46MHz
BCK
to 7851 on part 2 (DAC)
WS
DACDATA
352KHz
+4V
3864 100R
2827 100n
MP832
3.8V
MP862
KILLL
KILLR
V1
V2
9802
3709
3710
10K
22K
3828
3831
MP864
to 1805 on part 2 (DAC)
for provision only
kill circuitry
SUB
RCK
SFSY
SBSY
to 7876 on part 2 (CD-TEXT IC)
LDON
V2
V1
CFLG
C2FAIL
VDD3C
STATUS
RESET
VSS4
NC
SILD
RAB
SCL
SDA
CL4
VSS3
VSSA1
VDDA1
D1
D2
D3
VRL
D4
R1
R2
IREFT
VRH
VSSA2
SELPLL
ISLICE
HFIN
VSSA3
HFREF
IREF
VDDA2
TEST1
CRIN
CROUT
TEST2
CL16
CL11
RA
FO
SL
TEST3
VDD1P
DOBM
VSS1
SCLK
VDD2P
WCLK
DATA
MISC
KILL
V3
V4
V5
VSS2
MOTO2
MOTO1
MICROPROCESSOR INTERFACE
VERSATILE PINS
V1...VV5
SERIAL DATA INTERFACE
AUDIO PROCESSOR
KILL
PEAK DETECT
SUBCODE PROCESSOR
CONTROL PART
ADC
PRE-PROC.
FUNCTION CONTROL
ERROR CORRECTION
FLAGS
EBU INT.
EFM DEMOD.
SRAM
RAM ADDR.
Vref
DIGITAL PLL
MOTOR CONTROL
FRONT END
TIMING
OUTPUT STAGES
+4V
560R
3897
MP870
VCC of 7801
2.1V
2884 100n
MP861
HF
3813 10K
7801-D
2820 47p
1V
3820 3K3
3893 22K
7801-B
3823 3K3
3824 3K3
3821 3K3
3816 3K3
2821 15p
7801-C
MP820
2867 47p
2822 2n2
3825 1K
MP855
390K 3827
4V
0V
3840 150K
MP839
3841 6k8
3839 150K
MP838
10V
3852 3R3
2837
+10V
SelPLL
2825 100n
MP893
22K 3826
2823 47p
2824 22n
3867 100K
3849 8K2
3848 8K2
MP842
2846 22n
3850 470R
2847
+4servo
3837 1K
1.9V
MP843
2835 100n
2836 47u
3838 1K
for provision only
3846 8K2
2844 1n2
3845 10K
MP841
3853 3R3
+10V
TRACK
3843 8K2
2841 1n2
3842 10K
MP840
3844
EYE-PATTERN
800mVpp
TB=0,5 µs/DIV
+4V
3862 100R
MP827
3.8V
2887 100n
2831 4u7
3833 10K
MP829
MP830
3856 1R
3830 1M
1810
TF01
2834 22p
2833 22p
for digital out (3856->330R)
100n
2828
EBUGND
+4V
3863 100R
MP831
3.8V
+4servo
to servo drivers (7806,7807) at 3837
EBU to dig. out circuitry on part 2
INNERSW1
INNERSW2
to 7873 on part 2
EVM
DC voltages measured in play mode
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H

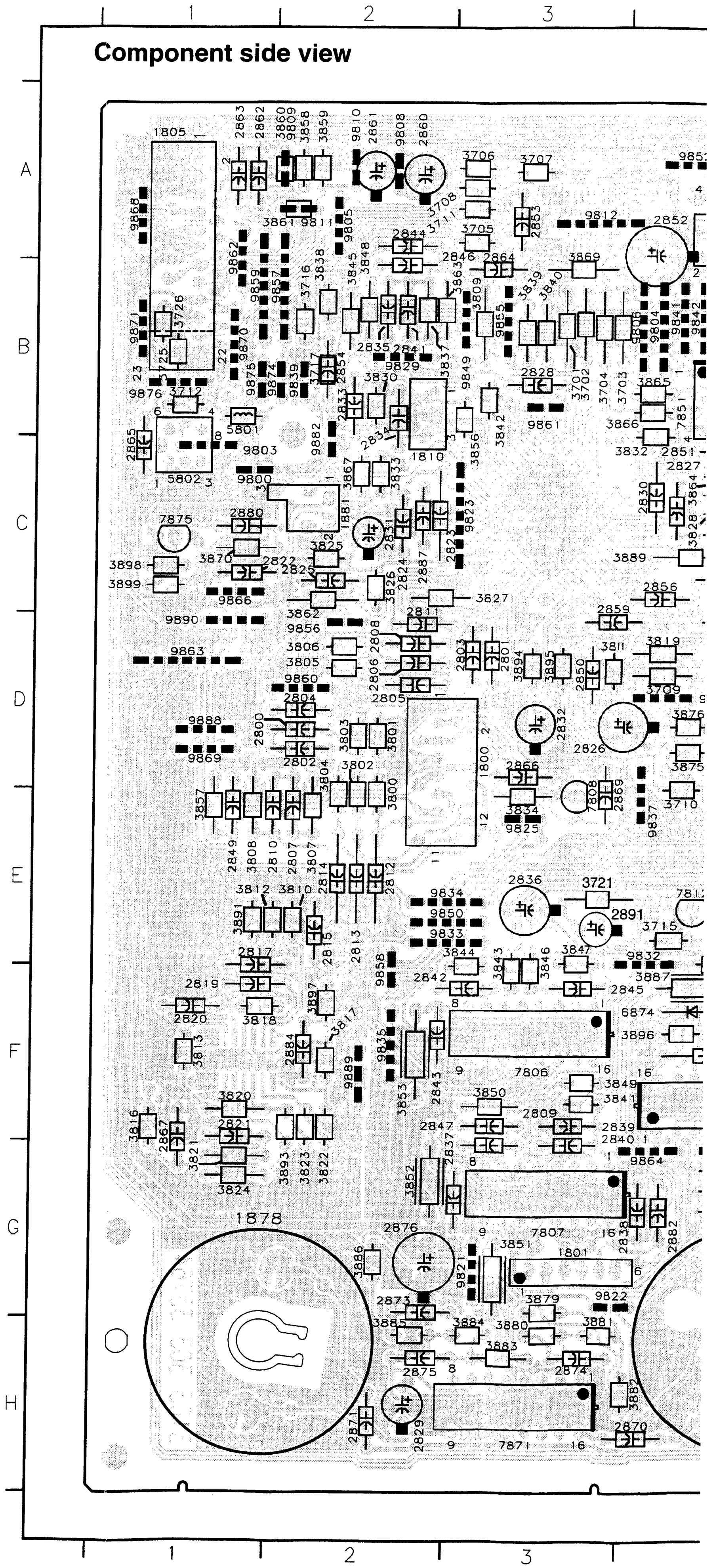
1800	D1
1801	F1
1810	G11
2800	B4
2801	B5
2802	B4
2803	B5
2804	A4
2805	A5
2806	A5
2807	C4
2808	C5
2809	F5
2810	C4
2811	C5
2812	C3
2813	C3
2814	C3
2815	D3
2817	D4
2819	D5
2820	D6
2821	D8
2822	E8
2823	F9
2824	G9
2825	F9
2826	B11
2827	C14
2828	G13
2831	G10
2832	B10
2833	H11
2834	H11
2835	G7
2836	G7
2837	F5
2838	E5
2839	E5
2840	E5
2841	H6
2842	H5
2843	G5
2844	G6
2845	G5
2846	F6
2847	F5
2849	E3
2850	B12
2856	B13
2859	B11
2866	E3
2867	D7
2869	E3
2884	D7
2887	G10
3709	D15
3710	D15
3800	B4
3801	B4
3802	A4
3803	A4
3804	A4
3805	A4
3806	A4
3807	B4
3808	C4
3810	D4
3811	B12
3812	D4
3813	C6
3816	D8
3817	D5
3818	C5
3819	B12
3820	D6
3821	D8
3822	D5
3823	D6
3824	D7
3825	E8
3826	F10
3827	E10
3828	D14
3830	G11
3831	D14
3833	G11
3834	B10
3837	F8
3838	G8
3839	E6
3840	E6
3841	E6
3842	G6
3843	G6
3844	H5
3845	G6
3846	G6
3847	G5
3848	F6
3849	F6
3850	F6
3852	E6
3853	G5
3856	G11
3857	D3
3862	G10
3863	G13
3864	C14
3867	G10
3873	B13
3889	B13
3890	B12
3891	D4
3893	D7
3894	B10
3895	B11
3897	D7
7800	E9
7801-A	D5
7801-B	D7
7801-C	D8
7801-D	D6
7801-E	D5
7801-F	D4
7806	G5
7807	E4
7808	B10
9802	D14
MP812	B2
MP813	A2
MP814	A2
MP815	E2
MP816	B2
MP817	C4
MP818	D3
MP820	D8
MP821	B12
MP826	B11
MP827	G10
MP828	B11
MP829	G11
MP830	G11
MP831	G13
MP832	C14
MP837	B10
MP838	E6
MP839	E6
MP840	G7
MP841	G7
MP842	F7
MP843	G7
MP844	C10
MP845	H3
MP846	F2
MP847	F2
MP848	E2
MP849	E2
MP850	E2
MP851	E2
MP852	F2
MP853	F2
MP855	D10
MP858	B10
MP859	H3
MP860	D3
MP861	D7
MP862	D14
MP864	E14
MP870	C7
MP872	G5
MP873	E5
MP875	C11
MP893	F9

Copper side view

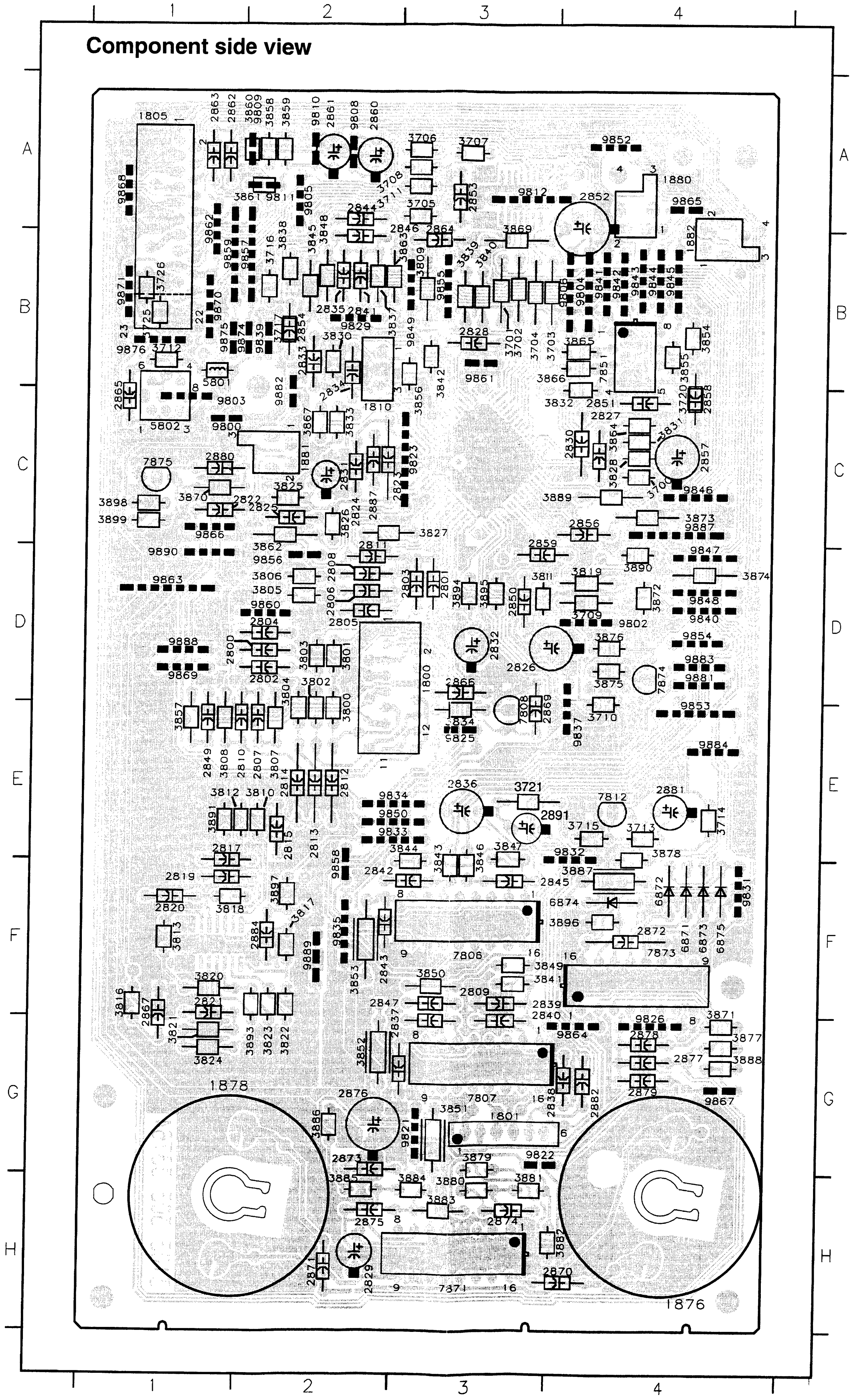


1800	E3
1801	H2
1805	B5
1810	C3
1876	I1
1878	I4
1880	B2
1881	C4
1882	B1
2800	D4
2801	D3
2802	E4
2803	D3
2804	D4
2805	D3
2806	D3
2807	E4
2808	D3
2809	G3
2810	E4
2811	D3
2812	F4
2813	F4
2814	F4
2815	F4
2817	F4
2819	F4
2820	F5
2821	G5
2822	D5
2823	C3
2824	C4
2825	D4
2826	D2
2827	C2
2828	B3
2829	I3
2830	C2
2831	C4
2832	E3
2833	B4
2834	C3
2835	B4
2836	F3
2837	H3
2838	H2
2839	G2
2840	G2
2841	B3
2842	F3
2843	G3
2844	B4
2845	F2
2846	B4
2847	G3
2849	E5
2850	D2
2851	C1
2852	A2
2853	A3
2854	B4
2856	D2
2857	C1
2858	C1
2859	D2
2860	A3
2861	A4
2862	A4
2863	A5
2864	B3
2865	C5
2866	E3
2867	G5
2869	E2
2870	I2
2871	I4
2872	G2
2873	H3
2874	I2
2875	I3
2876	H3
2877	G1
2878	G1
2879	H1
2880	C5
2881	F1
2882	H2
2884	G4
2887	C3
3700	C1
3701	B3
3702	B2
3703	B2
3704	B2
3705	A3
3706	A3
3707	A3
3708	A3
3709	D2
3710	E2
3711	A3
3712	B5
3713	F1
3714	F1
3715	F2
3716	B4
3717	B4
3720	C1
3725	B5
3726	B5
3800	E4
3801	E4
3802	E4
3803	E4
3804	E4
3805	D4
3806	D4
3807	E4
3808	E4
3809	B3
3810	F4
3811	D2
3812	F4
3813	G5
3816	G5
3817	G4
3818	F4
3819	D2
3820	G5
3821	G5
3822	G4
3823	G4
3824	G5
3825	C4
3826	D4
3827	D3
3828	C1
3830	B4
3831	C1
3832	C2
3833	C4
3834	E3
3837	B3
3838	B4
3839	B3
3840	B3
3841	G2
3842	B3
3843	F3
3844	F3
3845	B4
3846	F3
3847	F2
3848	B4
3849	G2
3850	G3
3851	H3
3852	G3
3853	G3
3854	B1
3855	B1
3856	C3
3857	E5
3858	A4
3859	A4
3860	A4
3861	A4
3862	D4
3863	B3
3864	C1
3865	B2
3866	C2
3867	C4
3869	B2
3870	C5
3871	G1
3872	D1
3873	D1
3874	D1
3875	E2
3876	E2
3877	G1
3878	F2
3879	H3
3880	H3
3881	H2
3882	I2
3883	I3
3884	H3
3885	H3
3886	H4
3887	F2
3888	H1
3889	C2
3890	D1
3891	F4
3893	G4
3894	D3
3895	D3
3896	G2
3897	F4
3898	D5
3899	D5
5801	B5
5802	C5
6871	F1
6872	F1
6873	F1
6874	F2
6875	F1
7800	C2
7801	G4
7806	G3
7807	H3
7808	E2
7812	F2
7851	B2
7871	I3
7873	G1
7874	E1
7875	C5
9800	C4
9802	D2
9803	C5
9804	B2
9805	A4
9806	B2
9808	A4
9809	A4
9810	A4
9811	A4
9812	A2
9821	H3
9822	H2
9823	C3
9825	E3
9826	G1
9829	B4
9831	F1
9832	F2
9833	F3
9834	F3
9835	G4
9837	E2
9839	B4
9840	D1
9841	B2
9842	B2
9843	B2
9844	B1
9845	B1
9846	C1
9847	D1
9848	D1
9849	B3
9850	F3
9852	A2
9853	E1
9854	D1
9855	B3
9856	D4
9857	B4
9858	F4
9859	B4
9860	D4
9861	B3
9862	B5
9863	D5
9864	G2
9865	A1
9866	D5
9867	H1
9868	A5
9869	E5
9870	B5
9871	B5
9874	B4
9875	B4
9876	B5
9881	E1
9882	C4
9883	E1
9884	E1
9887	D1
9888	E5
9889	G4
9890	D5

Component side view

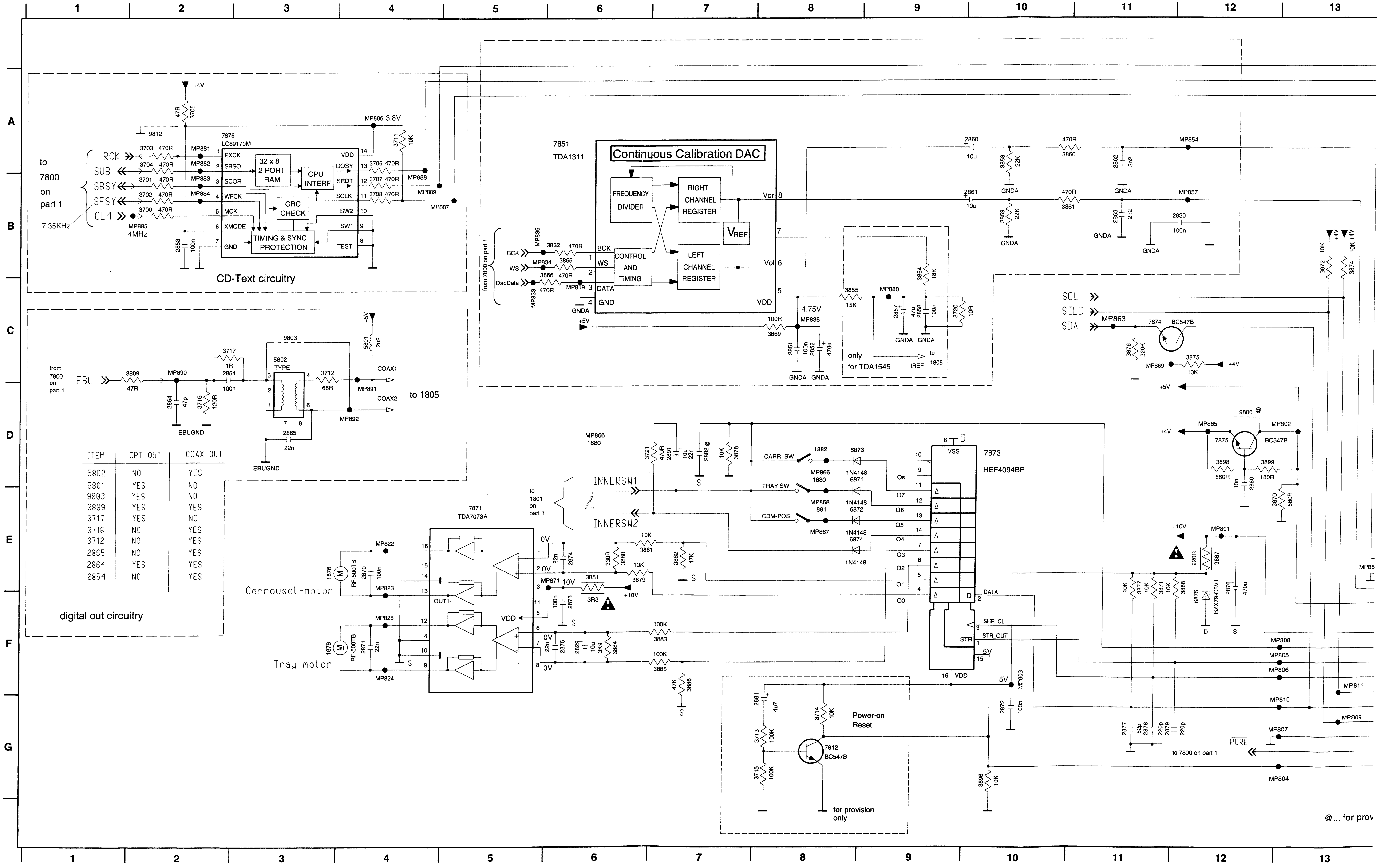


1800	E3
1801	H2
1805	B5
1810	C3
1876	I1
1878	I4
1880	B2
1881	C4
1882	B1
2800	D4
2801	D3
2802	E4
2803	D3
2804	D4
2805	D3
2806	D3
2807	E4
2808	D3
2809	G3
2810	E4
2811	D3
2812	F4
2813	F4
2814	F4
2815	F4
2817	F4
2819	F4
2820	F5
2821	G5
2822	D5
2823	C3
2824	C4
2825	D4
2826	D2
2827	C2
2828	B3
2829	I3
2830	C2
2831	C4
2832	E3
2833	B4
2834	C3
2835	B4
2836	F3
2837	H3
2838	H2
2839	G2
2840	G2
2841	B3
2842	F3
2843	G3
2844	B4
2845	F2
2846	B4
2847	G3
2849	E5
2850	D2
2851	C1
2852	A2
2853	A3
2854	B4
2856	D2
2857	C1
2858	C1
2859	D2
2860	A3
2861	A4
2862	A4
2863	A5
2864	B3
2865	C5
2866	E3
2867	G5
2869	E2
2870	I2
2871	I4
2872	G2
2873	H3
2874	I2
2875	I3
2876	H3
2877	G1
2878	G1
2879	H1
2880	C5
2881	F1
2882	H2
2884	G4
2887	C3
3700	C1
3701	B3
3702	B2
3703	B2
3704	B2
3705	A3
3706	A3
3707	A3
3708	A3
3709	D2
3710	E2
3711	A3
3712	B5
3713	F1
3714	F1
3715	F2
3716	B4
3717	B4
3720	C1
3725	B5
3726	B5
3800	E4
3801	E4
3802	E4
3803	E4
3804	E4
3805	D4
3806	D4
3807	E4
3808	E4
3809	B3
3810	F4
3811	D2
3812	F4
3813	G5
3816	G5
3817	G4
3818	F4
3819	D2
3820	G5
3821	G5
3822	G4
3823	G4
3824	G5
3825	C4
3826	D4
3827	D3
3828	C1
3830	B4
3831	C1
3832	C2
3833	C4
3834	E3
3837	B3
3838	B4
3839	B3
3840	B3
3841	G2
3842	B3
3843	F3
3844	F3
3845	B4
3846	F3
3847	F2
3848	B4
3849	G2
3850	G3
3851	H3
3852	G3
3853	G3
3854	B1
3855	B1
3856	C3
3857	E5
3858	A4
3859	A4
3860	A4
3861	A4
3862	D4
3863	B3
3864	C1
3865	B2
3866	C2
3867	C4
3869	B2
3870	C5
3871	G1
3872	D1
3873	D1
3874	D1
3875	E2
3876	E2
3877	G1
3878	F2
3879	H3
3880	H3
3881	H2
3882	I2
3883	I3
3884	H3
3885	H3
3886	H4
3887	F2
3888	H1
3889	C2
3890	D1
3891	F4
3893	G4
3894	D3
3895	D3
3896	G2
3897	F4
3898	D5
3899	D5
5801	B5
5802	C5
6871	F1
6872	F1
6873	F1
6874	F2
6875	F1
7800	C2
7801	G4
7806	G3
7807	H3
7808	E2
7812	F2
7851	B2
7871	I3
7873	G1
7874	E1
7875	C5
9800	C4
9802	D2
9803	C5
9804	B2
9805	A4
9806	B2
9808	A4
9809	A4
9810	A4
9811	A4
9812	A2
9821	H3
9822	H2
9823	C3
9825	E3
9826	G1
9829	B4
9831	F1
9832	F2
9833	F3
9834	F3
9835	G4
9837	E2
9839	B4
9840	D1
9841	B2
9842	B2
9843	B2
9844	B1
9845	B1
9846	C1
9847	D1
9848	D1
9849	B3
9850	F3
9852	A2
9853	E1
9854	D1
9855	B3
9856	D4
9857	B4
9858	F4
9859	B4
9860	D4
9861	B3
9862	B5
9863	D5
9864	G2
9865	A1
9866	D5
9867	H1
9868	A5
9869	E5
9870	B5
9871	B5
9874	B4
9875	B4
9876	B5
9881	E1
9882	C4
9883	E1
9884	E1
9887	D1
9888	E5
9889	G4
9890	D5

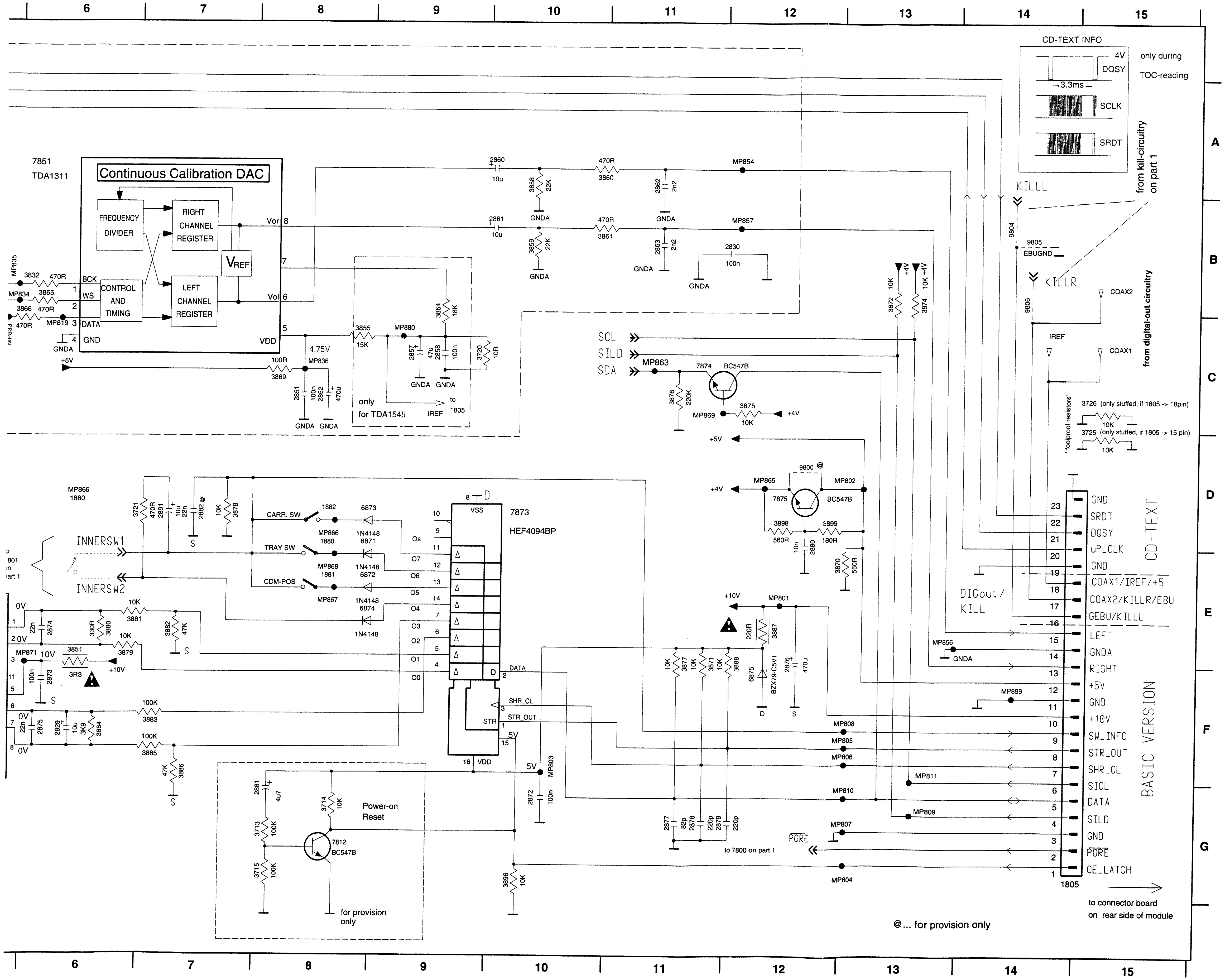

Component side view

1800	D3
1801	G3
1805	A1
1810	B2
1876	H4
1878	H1
1880	B4
1881	C2
1882	B4
2800	D2
2801	D3
2802	D2
2803	D3
2804	D2
2805	D2
2806	D2
2807	E2
2808	D2
2809	F3
2810	E2
2811	D2
2812	E2
2813	E2
2814	E2
2815	E2
2817	F1
2819	F1
2820	F1
2821	G1
2822	C1
2823	C2
2824	C2
2825	C2
2826	D3
2827	C4
2828	B3
2829	H2
2830	C4
2831	C2
2832	D3
2833	B2
2834	B2
2835	B2
2836	E3
2837	G2
2838	G4
2839	F3
2840	F3
2841	B2
2842	F3
2843	F2
2844	B2
2845	F3
2846	B2
2847	F3
2849	E1
2850	D3
2851	C4
2852	A4
2853	A3
2854	B2
2856	C4
2857	C4
2858	C4
2859	C3
2860	A2
2861	A2
2862	A1
2863	A1
2864	B3
2865	C1
2866	E3
2867	F1
2869	E3
2870	H4
2871	H2
2872	F4
2873	G2
2874	H3
2875	H2
2876	G3
2877	G4
2878	G4
2879	G4
2880	C1
2881	E4
2882	G4
2884	F2
2887	C2
3700	C4
3701	B3
3702	B3
3703	B3
3704	B3
3705	A3
3706	A3
3707	A3
3708	A3
3709	D4
3710	E4
3711	A3
3712	B1
3713	E4
3714	E4
3715	E4
3716	B2
3717	B2
3720	C4
3725	B1
3726	B1
3800	E2
3801	D2
3802	E2
3803	D2
3804	E2
3805	D2
3806	D2
3807	E2
3808	E1
3809	B3
3810	E2
3811	D3
3812	E2
3813	F1
3816	F1
3817	F2
3818	F1
3819	D4
3820	F1
3821	G1
3822	F2
3823	F2
3824	G1
3825	C2
3826	C2
3827	C2
3828	C4
3830	B2
3831	C4
3832	C4
3833	C2
3834	E3
3837	B2
3838	B2
3839	B3
3840	B3
3841	F3
3842	B3
3843	F3
3844	F3
3845	B2
3846	F3
3847	E3
3848	B2
3849	F3
3850	F3
3851	G3
3852	G2
3853	F2
3854	B4
3855	B4
3856	B3
3857	E1
3858	A2
3859	A2
3860	A2
3861	A2
3862	C2
3863	B2
3864	C4
3865	B4
3866	B4
3867	C2
3869	B3
3870	C1
3871	G4
3872	D4
3873	C4
3874	D4
3875	D4
3876	D4
3877	G4
3878	E4
3879	G3
3880	H3
3881	H3
3882	H4
3883	H3
3884	H3
3885	H2
3886	G2
3887	F4
3888	G4
3889	C4
3890	D4
3891	E1
3893	F2
3894	D3
3895	D3
3896	F4
3897	F2
3898	C1
3899	C1
5801	B1
5802	C1
6871	F4
6872	F4
6873	F4
6874	F4
6875	F4
7806	F3
7807	G3
7808	E3
7812	E4
7851	B4
7871	H3
7873	F4
7874	D4
7875	C1
9800	C1
9802	D4
9803	C1
9804	B4
9805	A2
9806	B4
9808	A2
9809	A2
9810	A2
9811	A2
9812	A3
9821	G3
9822	G3
9823	C3
9825	E3
9826	G4
9829	B2
9831	F4
9832	E4
9833	E2
9834	E2
9835	F2
9837	E4
9839	B2
9840	D4
9841	B4
9842	B4
9843	B4
9844	B4
9845	B4
9846	C4
9847	D4
9848	D4
9849	B3
9850	E2
9852	A4
9853	E4
9854	D4
9855	B3
9856	D2
9857	B2
9858	F2
9859	B1
9860	D2
9861	B3
9862	A1
9863	D1
9864	G4
9865	A4
9866	C1
9867	G4
9868	A1
9869	D1
9870	B1
9871	B1
9874	B2
9875	B1
9876	B1
9881	D4
9882	C2
9883	D4
9884	E4
9887	C4
9888	D1
9889	F2
9890	D1

Circuit Diagram Main Board part2

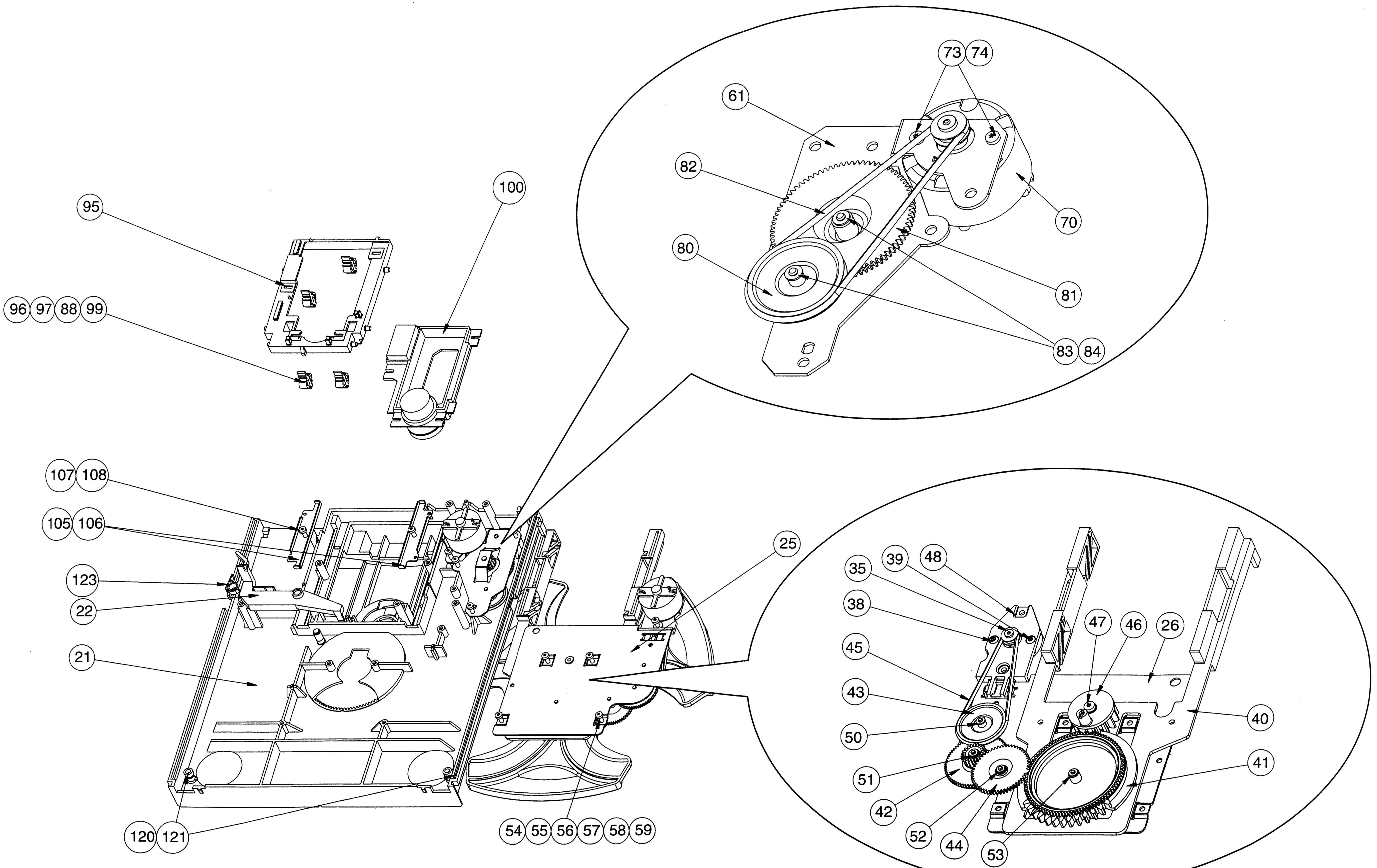

CD-Text circuitry
7876
LC89170M
EXCK
SBSO
SCOR
WFCK
MCK
XMODE
GND
VDD
DQSY
SRDT
SCLK
SW2
SW1
TEST
32 x 8
2 PORT
RAM
CPU
INTERF
CRC
CHECK
TIMING & SYNC
PROTECTION
to
7800
on
part 1
RCK
SUB
SBSY
SFSY
CL4
7.35KHz
MP885
4MHz
MP886 3.8V
+4V
7851
TDA1311
Continuous Calibration DAC
FREQUENCY
DIVIDER
RIGHT
CHANNEL
REGISTER
LEFT
CHANNEL
REGISTER
CONTROL
AND
TIMING
VREF
BCK
WS
DATA
GND
Vor
Vol
VDD
from 7800 on part 1
DacData
4.75V
only
for TDA1545
IREF
to
1805
digital out circuitry
from
7800
on
part 1
EBU
5802
TYPE
COAX1
COAX2
to 1805
EBUGND
7871
TDA7073A
Carrousel-motor
Tray-motor
RF-500TB
OUT1-
0V
VDD
+10V
7873
HEF4094BP
VSS
CARR. SW
TRAY SW
CDM-POS
INNERSW1
INNERSW2
to
1801
on
part 1
DATA
SHR_CL
STR_OUT
STR
Power-on
Reset
7812
BC547B
for provision
only
SCL
SILD
SDA
7874
BC547B
7875
BC547B
BZX79-C5V1
to 7800 on part 1
PORE
@... for prov

ITEM	OPT_OUT	COAX_OUT
5802	NO	YES
5801	YES	NO
9803	YES	NO
3809	YES	YES
3717	YES	NO
3716	NO	YES
3712	NO	YES
2865	NO	YES
2864	YES	YES
2854	NO	YES


6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
CD-TEXT INFO
4V
DQSY
only during
TOC-reading
3.3ms
SCLK
SRDT
from kill-circuitry on part 1
KILLL
KILLR
9804
9805
EBUGND
9806
COAX2
COAX1
IREF
from digital-out circuitry
7851
TDA1311
Continuous Calibration DAC
FREQUENCY DIVIDER
RIGHT CHANNEL REGISTER
LEFT CHANNEL REGISTER
CONTROL AND TIMING
VREF
Vor 8
Vol 6
BCK
WS
DATA
GND
VDD
MP835
3832 470R
MP834
3865
3866 470R
MP819
MP833
470R
GNDA
+5V
100R
3869
4.75V
MP836
2851 100n
2852 470u
GNDA
2860 10u
2861 10u
3858 22K
3859 22K
470R 3860
470R 3861
2862 2n2
2863 2n2
MP854
MP857
2830 100n
GNDA
3855 15K
MP880
3854 18K
2857 47u
2858 100n
3720 10R
only for TDA1545
IREF
to 1805
SCL
SILD
SDA
MP863
7874 BC547B
3876 220K
MP869
3875 10K
+4V
+5V
3872 10K
3874 10K
MP866 1880
3721 470R
2891 10u
22n
2882 @
3878 10K
CARR. SW
1882
6873
1N4148
TRAY SW
MP866 1880
6871
MP868 1881
6872
CDM-POS
MP867
6874
INNERSW1
INNERSW2
10K 3881
330R 3880
10K 3879
3882 47K
22n 2874
3851 3R3
MP871 10V
100n 2873
+10V
100K 3883
100K 3885
2875 22n
2829 10u
3K9 3884
3886 47K
7873
HEF4094BP
VSS
VDD
STR
DATA
SHR_CL
STR_OUT
O0
O1
O2
O3
O4
O5
O6
O7
Os
5V
MP803
2872 100n
2881 4u7
3714 10K
3713 100K
3715 100K
7812 BC547B
Power-on Reset
for provision only
3896 10K
9800 @
MP865
MP802
7875 BC547B
3898 560R
3899 180R
2880 10n
3870 560R
+10V
MP801
220R 3887
6875 BZX79-C5V1
2876 470u
3877 10K
3871 10K
3888 10K
2877 82p
2878 220p
2879 220p
to 7800 on part 1
MP808
MP805
MP806
MP811
MP810
MP809
MP807
MP804
MP899
MP856
GNDA
PORE
DIGout / KILL
'foolproof resistors'
3726 (only stuffed, if 1805 -> 18pin)
3725 (only stuffed, if 1805 -> 15 pin)
10K
CD-TEXT
BASIC VERSION
GND
SRDT
DQSY
uP_CLK
GND
COAX1/IREF/+5
COAX2/KILLR/EBU
GEBU/KILLL
LEFT
GNDA
RIGHT
+5V
GND
+10V
SW_INFO
STR_OUT
SHR_CL
SICL
DATA
SILD
GND
PORE
OE_LATCH
1805
to connector board on rear side of module
@... for provision only

1805	G14
1876	E3
1878	F3
1880	D8
1881	E8
1882	D8
2829	F6
2830	B12
2851	C8
2852	C8
2853	B2
2854	C2
2857	C9
2858	C9
2860	A10
2861	B10
2862	A11
2863	B11
2864	D2
2865	D3
2870	E4
2871	F4
2872	G10
2873	F6
2874	E6
2875	F6
2876	E12
2877	G11
2878	G11
2879	G11
2880	D12
2881	G8
2882	D7
3700	B2
3701	B2
3702	B2
3703	A2
3704	A2
3705	A2
3706	A4
3707	B4
3708	B4
3711	A4
3712	C3
3713	G8
3714	G8
3715	G8
3716	D2
3717	C2
3720	C9
3725	D15
3726	C15
3809	C2
3832	B6
3851	E6
3854	B9
3855	C8
3858	A10
3859	B10
3860	A10
3861	B10
3865	B6
3866	C6
3869	C8
3870	E12
3871	E11
3872	B13
3874	B13
3875	C12
3876	C11
3877	E11
3878	D7
3879	E6
3880	E6
3881	E6
3882	E7
3883	F7
3884	F6
3885	F7
3886	F7
3887	E12
3888	E12
3896	G10
3898	D12
3899	D12
5801	C4
5802	C3
6871	D8
6872	E8
6873	D8
6874	E8
6875	F12
7812	G8
7851	A6
7871	E5
7873	D10
7874	C11
7875	D12
7876	A2
9800	D12
9803	C3
9804	B14
9805	B14
9806	B14
9808	A10
9809	A10
9810	B10
9811	B10
9812	A2
MP801	E12
MP802	D13
MP803	F10
MP804	G13
MP805	F13
MP806	F13
MP807	G13
MP808	F13
MP809	G13
MP810	G13
MP811	F13
MP819	C6
MP822	E4
MP823	E4
MP824	F4
MP825	F4
MP833	C5
MP834	B5
MP835	B5
MP836	C8
MP854	A12
MP856	E13
MP857	B12
MP863	C11
MP865	D12
MP866	D8
MP867	E8
MP868	E8
MP869	C11
MP871	E6
MP880	C9
MP881	A2
MP882	A2
MP883	B2
MP884	B2
MP885	B2
MP886	A4
MP887	B4
MP888	B4
MP889	B4
MP890	C2
MP891	D4
MP892	D4
MP899	F14

EXPLODED VIEW (3CDC MODULE)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100
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123
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120
121
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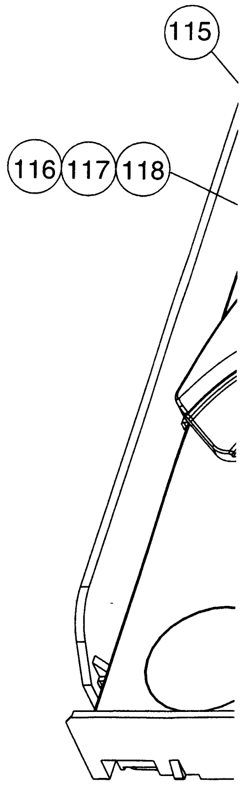
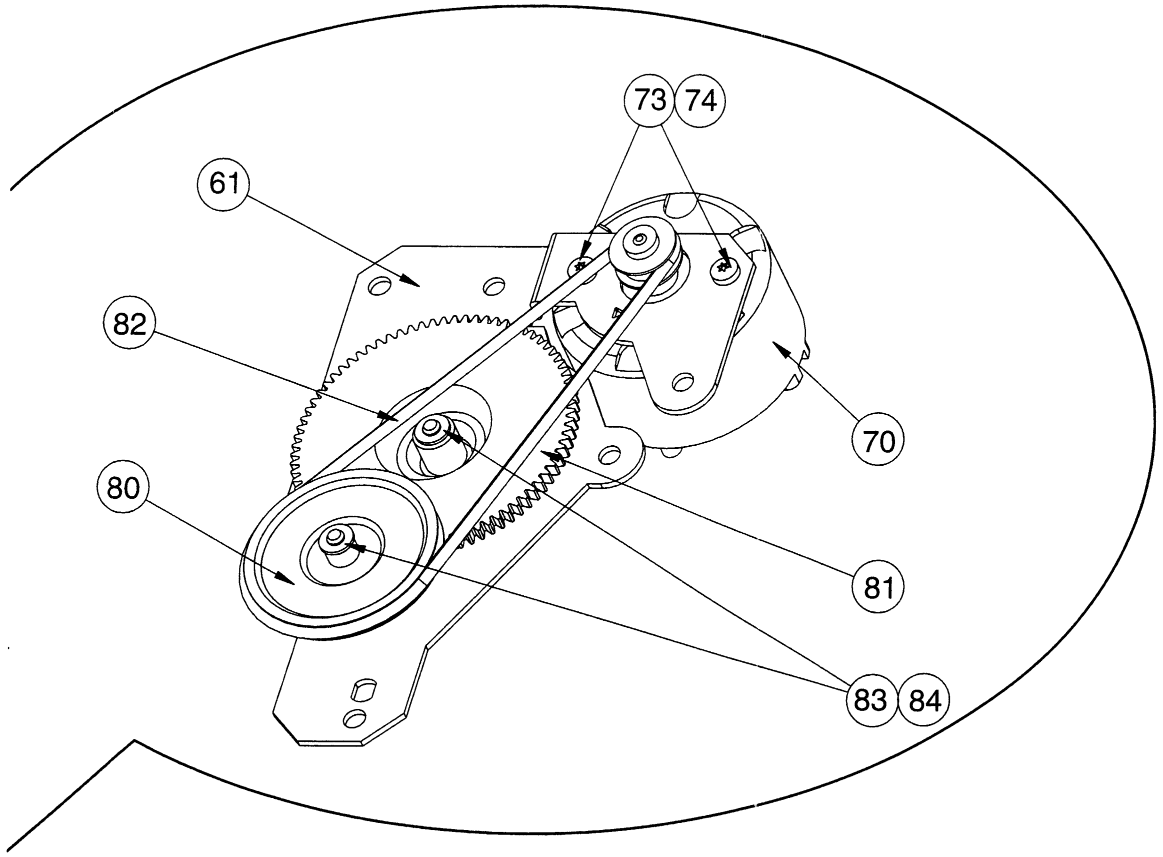

115
116
117
118

MECHANICAL PARTSLI

	4822 390 10136
3	4822 463 11008
4	4822 463 11009
21	4822 441 11615
22	4822 402 10088
38	4822 502 12548
39	4822 502 12548
40	4822 463 11011
41	4822 522 10509
42	4822 522 10492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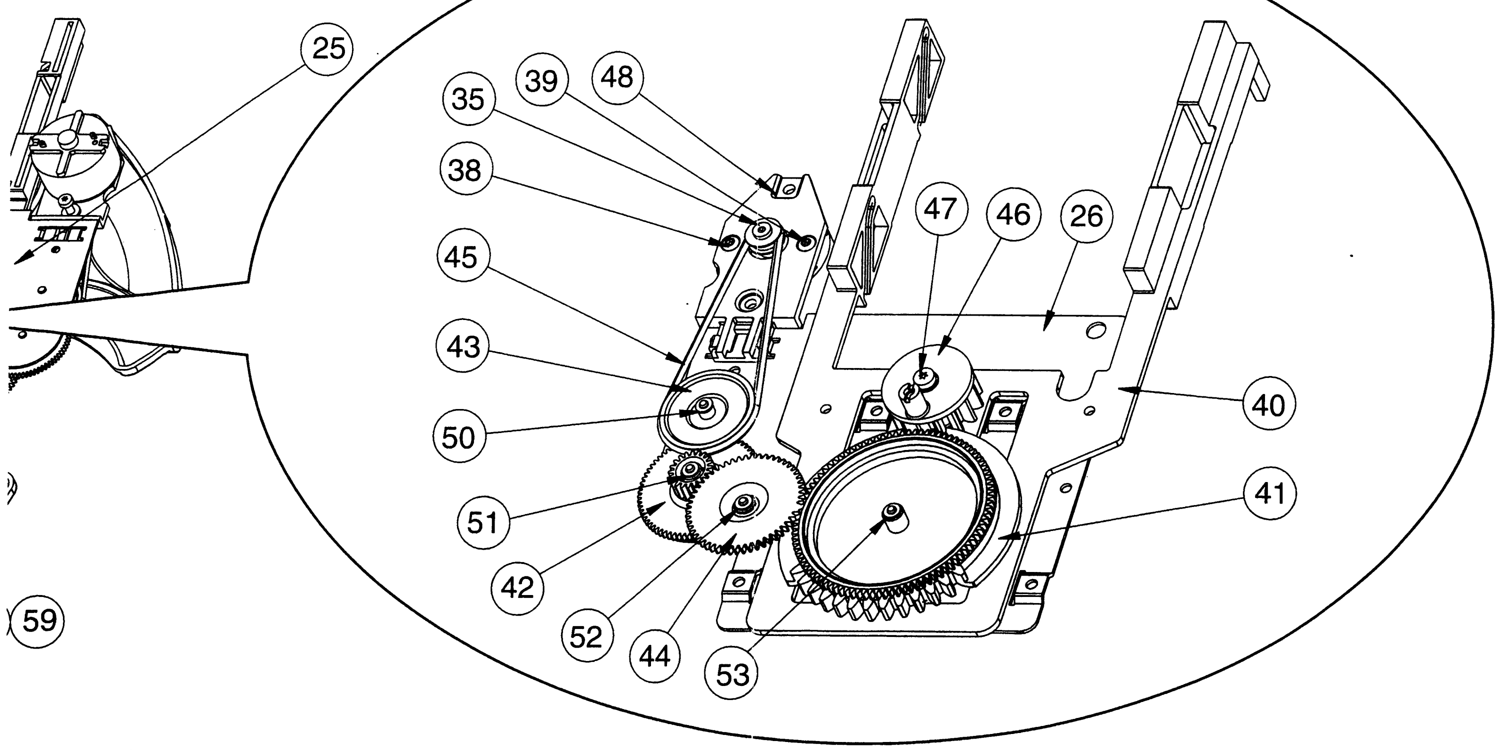
84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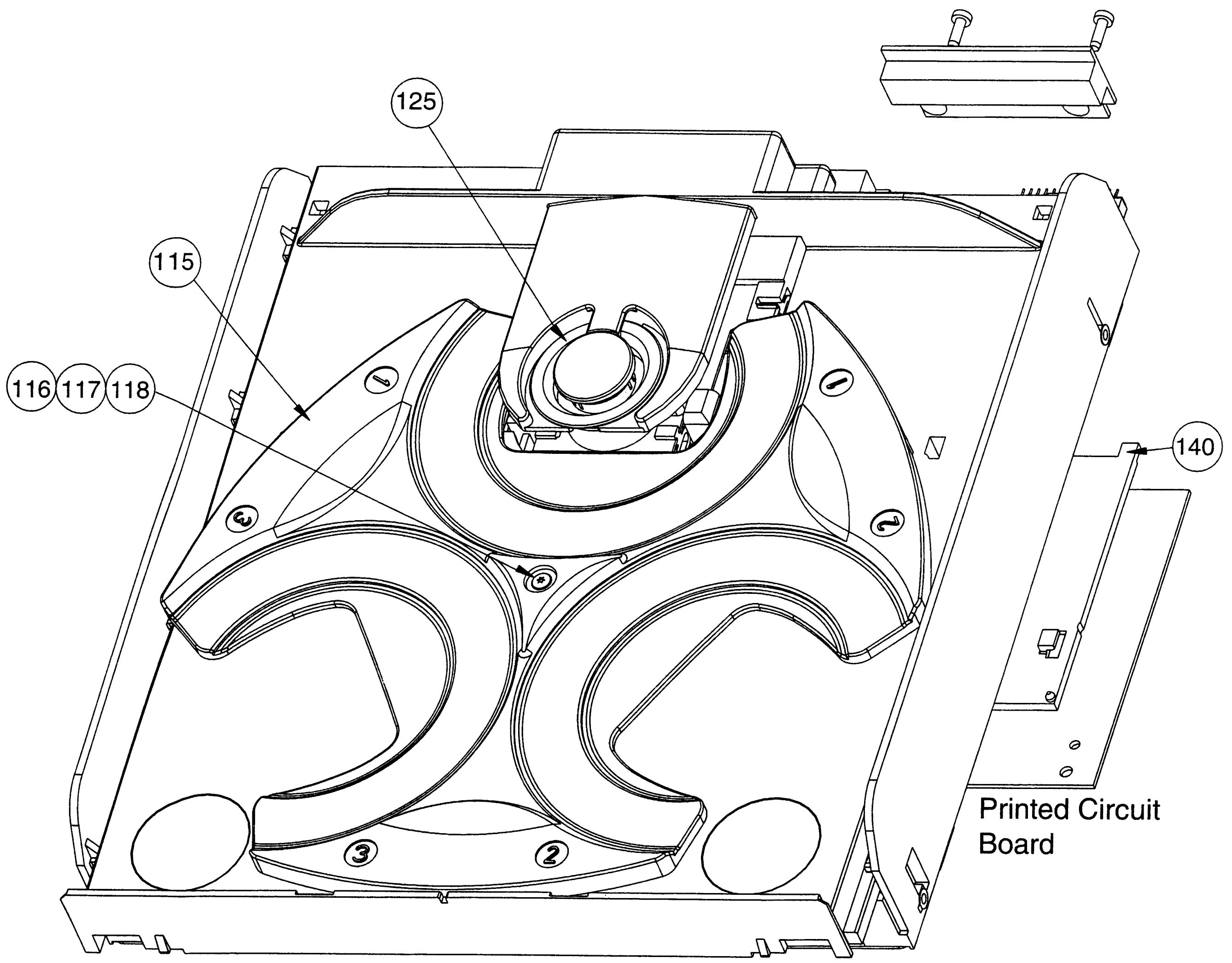
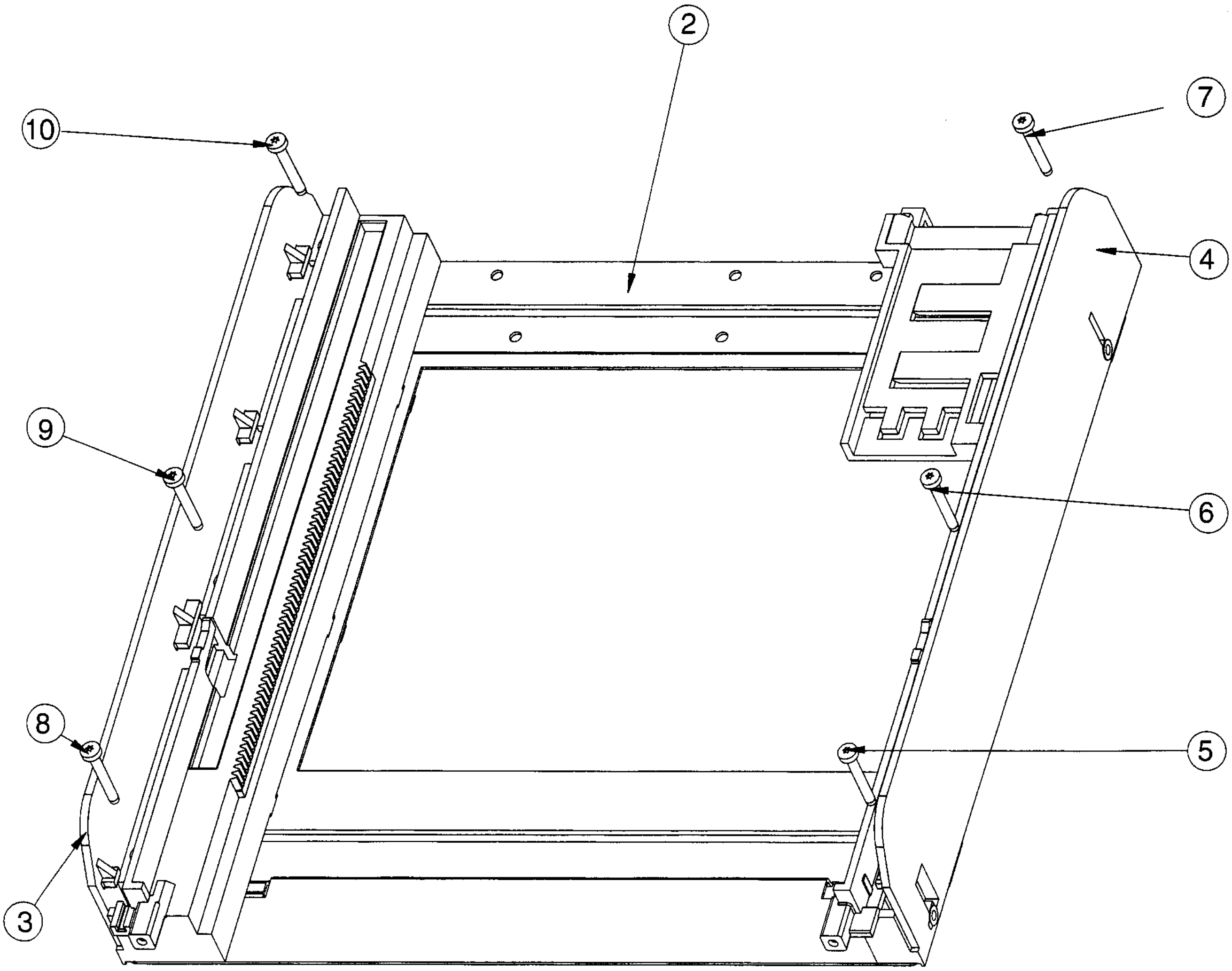

125
115
116
117
118
140
Printed Circuit
Board

MECHANICAL PARTSLIST 3CDC MODULE

	4822 390 10136	POLYLUB GLY801 (GREASE)
3	4822 463 11008	GUIDE LEFT
4	4822 463 11009	GUIDE RIGHT
21	4822 441 11615	DRAWER
22	4822 402 10088	BRACKET TUMBLER
38	4822 502 12548	SCREW M2,6X3,5
39	4822 502 12548	SCREW M2,6X3,5
40	4822 463 11011	SLIDE
41	4822 522 10509	CONTROL DISC
42	4822 522 10492	GEAR WHEEL
43	4822 528 10937	PULLEY
44	4822 522 10493	IDLER WHEEL
45	4822 358 10115	BELT
46	4822 466 10735	ECCENTRIC GEAR WHEEL
50	4822 532 12364	WASHER
51	4822 532 12364	WASHER
52	4822 532 12364	WASHER
53	4822 532 12364	WASHER
35	4822 361 10753	CARROUSEL MOTOR
70	4822 361 10753	CARROUSEL MOTOR



MECHANICAL PARTSLIST 3CDC MODULE

73	4822 502 12548	SCREW M2,6X3,5	98	4822 325 50215	SUSPENSION
74	4822 502 12548	SCREW M2,6X3,5	99	4822 325 50215	SUSPENSION
80	4822 528 10937	PULLEY	100	4822 691 10615	CD DRIVE VAM1201
81	4822 522 10494	GEAR DRAWER	115	4822 466 10736	CARROUSEL
82	4822 358 10115	BELT	117	4822 532 12365	BUSH DRAWER
83	4822 532 12364	WASHER	120	4822 532 51756	GROMMET
84	4822 532 12364	WASHER	121	4822 532 51756	GROMMET
95	4822 404 10894	SUPPORT	123	4822 402 10085	SWITCH BRACKET
96	4822 325 50215	SUSPENSION	125	4822 401 11708	DISC CLAMP
97	4822 325 50215	SUSPENSION	140	4822 466 10734	PLATE

ELECTRICAL PARTSLIST 3CDC MODULE

MISCELLANEOUS

1800	4822 267 51453	Flex Foil connector 12pin
1805	4822 265 10979	Flex Foil connector 15pin
1805	4822 265 11182	Flex Foil connector 23pin
1805	4822 265 11184	Flex Foil connector 18pin
1806	4822 265 10981	Flex Foil connector 15pin
1806	4822 267 10757	Flex Foil connector 23pin top entry
1806	4822 265 11185	Flex Foil connector 18pin top entry
1860	4822 265 11183	Flex Foil connector 4pin side entry
1880	4822 276 13503	Switch
1881	4822 276 13503	Switch
1882	4822 276 13503	Switch
8002	4822 320 11974	Flex Foil 15pin length= 190mm
8002	4822 320 12229	Flex Foil 18pin length= 190mm
8002	4822 320 12231	Flex Foil 23pin length= 190mm
8002	4822 320 12232	Flex Foil 15pin length= 480mm

CAPACITORS

2800	4822 126 10053	180pF	10%	50V
2801	4822 122 10466	220pF	10%	50V
2802	4822 126 10053	180pF	10%	50V
2803	4822 122 10466	220pF	10%	50V
2804	4822 126 12787	330pF	10%	50V
2805	4822 122 10466	220pF	10%	50V
2806	4822 122 10466	220pF	10%	50V
2807	4822 126 12878	1,5nF	10%	16V
2808	4822 122 10466	220pF	10%	50V
2809	4822 126 12882	100nF	20%	50V
2810	4822 122 10459	560pF	10%	50V
2811	4822 122 10466	220pF	10%	50V
2812	4822 122 10319	82pF	5%	50V
2813	4822 122 10319	82pF	5%	50V
2814	4822 122 33849	150pF	10%	50V
2815	4822 122 33192	27pF	5%	50V
2817	4822 122 33849	150pF	10%	50V
2819	4822 122 33848	47pF	5%	50V
2820	4822 122 33848	47pF	5%	50V
2821	4822 122 10462	15pF	5%	50V
2822	4822 126 12339	2,2nF	10%	16V
2823	4822 122 33848	47pF	5%	50V
2824	4822 126 11585	22nF	20%	50V
2825	4822 126 12882	100nF	20%	50V
2826	4822 124 23624	470µF	20%	16V
2827	4822 126 12882	100nF	20%	50V
2828	4822 126 12882	100nF	20%	50V
2829	4822 124 41579	10µF	20%	50V
2830	4822 126 12882	100nF	20%	50V
2831	4822 124 12032	4,7µF	20%	50V
2832	4822 124 12032	4,7µF	20%	50V
2833	4822 122 33191	22pF	5%	50V
2834	4822 122 33191	22pF	5%	50V
2835	4822 126 12882	100nF	20%	50V
2837	4822 126 12882	100nF	20%	50V
2838	4822 126 12882	100nF	20%	50V
2839	4822 126 12882	100nF	20%	50V
2840	4822 126 12882	100nF	20%	50V
2841	4822 122 10574	1,2nF	10%	16V
2842	4822 121 51387	10nF	20%	16V
2843	4822 126 12882	100nF	20%	50V
2844	4822 122 10574	1,2nF	10%	16V
2845	4822 121 51387	10nF	20%	16V
2846	4822 126 11585	22nF	20%	50V
2847	4822 126 12882	100nF	20%	50V

CAPACITORS

2849	4822 126 11585	22nF	20%	50V
2850	4822 122 33197	1nF	10%	50V
2851	4822 126 12882	100nF	20%	50V
2852	4822 124 80857	470µF	20%	16V
2853	4822 126 12882	100nF	20%	50V
2856	4822 122 33848	47pF	5%	50V
2859	4822 126 12882	100nF	20%	50V
2860	4822 124 41579	10µF	20%	50V
2861	4822 124 41579	10µF	20%	50V
2862	4822 126 12339	2,2nF	10%	16V
2863	4822 126 12339	2,2nF	10%	16V
2864	4822 122 33848	47pF	5%	50V
2866	4822 126 12882	100nF	20%	50V
2867	4822 122 33848	47pF	5%	50V
2868	4822 126 12882	100nF	20%	50V
2869	4822 126 12882	100nF	20%	50V
2870	4822 126 12882	100nF	20%	50V
2871	4822 126 11585	22nF	20%	50V
2872	4822 126 12882	100nF	20%	50V
2873	4822 126 12882	100nF	20%	50V
2874	4822 126 11585	22nF	20%	50V
2875	4822 126 11585	22nF	20%	50V
2876	4822 124 80857	470µF	20%	16V
2877	4822 122 10319	82pF	5%	50V
2878	4822 122 10466	220pF	10%	50V
2879	4822 122 10466	220pF	10%	50V
2880	4822 121 51387	10nF	20%	16V
2884	4822 126 12882	100nF	20%	50V
2887	4822 126 12882	100nF	20%	50V
2890	4822 124 23624	470µF	20%	16V
2891	4822 124 12125	10µF	20%	16V

RESISTORS

3700	4822 116 83883	470Ω	5%	0,16W
3701	4822 116 83883	470Ω	5%	0,16W
3702	4822 116 83883	470Ω	5%	0,16W
3703	4822 116 83883	470Ω	5%	0,16W
3704	4822 116 83883	470Ω	5%	0,16W
3705	4822 116 52195	47Ω	5%	0,5W
3706	4822 116 83883	470Ω	5%	0,16W
3707	4822 116 83883	470Ω	5%	0,16W
3708	4822 116 83883	470Ω	5%	0,16W
3710	4822 116 83864	10kΩ	5%	0,5W
3711	4822 116 83864	10kΩ	5%	0,5W
3717	4822 116 80176	1Ω	5%	0,5W
3720	4822 116 52176	10Ω	5%	0,5W
3721	4822 116 83883	470Ω	5%	0,16W
3725	4822 116 83864	10kΩ	5%	0,5W
3726	4822 116 83864	10kΩ	5%	0,5W
3800	4822 116 52239	120kΩ	5%	0,5W
3801	4822 116 83864	10kΩ	5%	0,5W
3802	4822 116 52239	120kΩ	5%	0,5W
3803	4822 116 83864	10kΩ	5%	0,5W
3804	4822 116 52291	56kΩ	5%	0,5W
3805	4822 116 83864	10kΩ	5%	0,5W
3806	4822 116 83864	10kΩ	5%	0,5W
3807	4822 116 83864	10kΩ	5%	0,5W
3808	4822 116 83864	10kΩ	5%	0,5W
3809	4822 116 52175	100Ω	5%	0,5W
3810	4822 050 11002	1kΩ	5%	0,2W
3812	4822 116 83884	47kΩ	5%	0,16W
3813	4822 116 83864	10kΩ	5%	0,5W
3816	4822 116 52269	3,3kΩ	5%	0,5W

ELECTRICAL PARTSLIST 3CDC MODULE

RESISTORS

3817	4822 116 83961	6,8kΩ	5%	0,16W
3818	4822 116 83864	10kΩ	5%	0,5W
3819	4822 116 83883	470Ω	5%	0,16W
3820	4822 116 52269	3,3kΩ	5%	0,5W
3821	4822 116 52269	3,3kΩ	5%	0,5W
3822	4822 116 52257	22kΩ	5%	0,5W
3823	4822 116 52269	3,3kΩ	5%	0,5W
3824	4822 116 52269	3,3kΩ	5%	0,5W
3825	4822 050 11002	1kΩ	5%	0,2W
3826	4822 116 52257	22kΩ	5%	0,5W
3827	4822 116 52278	390kΩ	5%	0,5W
3828	4822 116 52257	22kΩ	5%	0,5W
3830	4822 116 52235	1MΩ	5%	0,5W
3831	4822 116 52257	22kΩ	5%	0,5W
3832	4822 116 83883	470Ω	5%	0,16W
3833	4822 116 83864	10kΩ	5%	0,5W
3834	4822 116 52283	4,7kΩ	5%	0,5W
3837	4822 050 11002	1kΩ	5%	0,2W
3838	4822 050 11002	1kΩ	5%	0,2W
3839	4822 116 52245	150kΩ	5%	0,16W
3840	4822 116 52245	150kΩ	5%	0,16W
3841	4822 116 83961	6,8kΩ	5%	0,16W
3842	4822 116 83864	10kΩ	5%	0,5W
3843	4822 116 52303	8,2kΩ	5%	0,5W
3844	4822 116 52226	560Ω	5%	0,5W
3844	4822 116 83883	470Ω	5%	0,16W
3845	4822 116 83864	10kΩ	5%	0,5W
3846	4822 116 52303	8,2kΩ	5%	0,5W
3847	4822 116 52228	680Ω	5%	0,5W
3847	4822 116 83883	470Ω	5%	0,16W
3848	4822 116 52303	8,2kΩ	5%	0,5W
3849	4822 116 52303	8,2kΩ	5%	0,5W
3850	4822 116 83883	470Ω	5%	0,16W
3851	4822 052 10338	3,3Ω		NFR25
3852	4822 052 10338	3,3Ω		NFR25
3853	4822 052 10338	3,3Ω		NFR25
3856	4822 116 52219	330Ω	5%	0,5W
3856	4822 116 80176	1Ω	5%	0,5W
3857	4822 050 11002	1kΩ	5%	0,2W
3858	4822 116 52257	22kΩ	5%	0,5W
3859	4822 116 52257	22kΩ	5%	0,5W
3860	4822 116 83883	470Ω	5%	0,16W
3861	4822 116 83883	470Ω	5%	0,16W
3862	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52175	100Ω	5%	0,5W
3864	4822 116 52175	100Ω	5%	0,5W
3865	4822 116 83883	470Ω	5%	0,16W
3866	4822 116 83883	470Ω	5%	0,16W
3867	4822 116 52234	100kΩ	5%	0,5W
3868	4822 116 52191	33Ω	5%	0,5W
3869	4822 116 52175	100Ω	5%	0,5W
3870	4822 116 52226	560Ω	5%	0,5W
3871	4822 116 83864	10kΩ	5%	0,5W
3872	4822 116 83864	10kΩ	5%	0,5W
3873	4822 116 83883	470Ω	5%	0,16W
3874	4822 116 83864	10kΩ	5%	0,5W
3875	4822 116 83864	10kΩ	5%	0,5W
3876	4822 116 83874	220kΩ	5%	0,5W
3877	4822 116 83864	10kΩ	5%	0,5W
3878	4822 116 83864	10kΩ	5%	0,5W

RESISTORS

3879	4822 116 83864	10kΩ	5%	0,5W
3880	4822 116 52219	330Ω	5%	0,5W
3881	4822 116 83864	10kΩ	5%	0,5W
3882	4822 116 83884	47kΩ	5%	0,16W
3883	4822 116 52234	100kΩ	5%	0,5W
3884	4822 116 52276	3,9kΩ	5%	0,5W
3885	4822 116 52234	100kΩ	5%	0,5W
3886	4822 116 83884	47kΩ	5%	0,16W
3887	4822 052 10221	220Ω	5%	
3888	4822 116 83864	10kΩ	5%	0,5W
3889	4822 116 83883	470Ω	5%	0,16W
3890	4822 116 83883	470Ω	5%	0,16W
3891	4822 116 52272	330kΩ	5%	0,5W
3893	4822 116 52257	22kΩ	5%	0,5W
3894	4822 116 52191	33Ω	5%	0,5W
3895	4822 116 52176	10Ω	5%	0,5W
3896	4822 116 83864	10kΩ	5%	0,5W
3897	4822 116 52226	560Ω	5%	0,5W
3898	4822 116 52226	560Ω	5%	0,5W
3899	4822 116 52213	180Ω	5%	0,5W

COILS

1810	4822 242 10849	CRYSTAL 8MHz
1810	4822 242 73557	CERAMIC RES. 8,46MHz
5801	4822 157 11477	2,2µH

DIODES

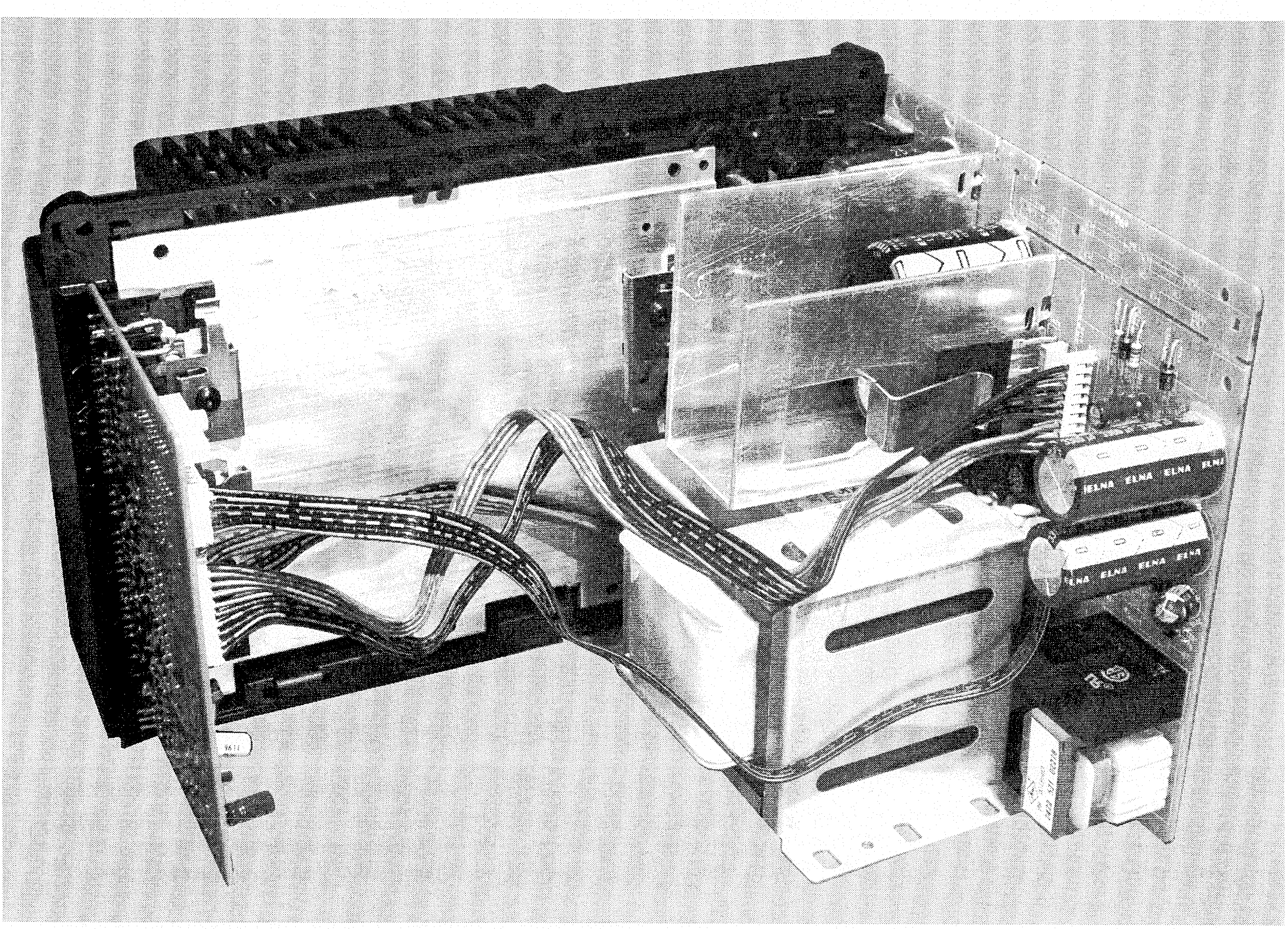
6871	4822 130 30621	1N4148
6872	4822 130 30621	1N4148
6873	4822 130 30621	1N4148
6874	4822 130 30621	1N4148
6875	4822 130 34233	BZX79-B5V1

TRANSISTORS

7808	4822 130 41344	BC337-40
7874	4822 130 40959	BC547B
7875	4822 130 40959	BC547B

INTEGRATED CIRCUITS

7800©	4822 209 12752	SAA7378GP (Signal Processor CD7)
7801©	5322 209 11517	PC74HCU04T (HF Amplifier)
7806	4822 209 32852	TDA7073A/N2 (Servo Driver)
7807	4822 209 32852	TDA7073A/N2 (Motor Driver)
7810	4822 130 10845	OPTICAL OUT UNIT
7851	4822 209 32421	TDA1311A/N2(DAC)
7871	4822 209 32852	TDA7073A/N2 (Motor Driver)
7873	5322 209 10421	HEF4094BP (Shift Register)
7876	4822 209 16143	LC89170M (CD Text)



POWER 4 Module

(2 Channel Version)

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Component layout 11-8
Circuit diagram Power stage 11-9
Partslist..........11-10

CIRCUIT DESCRIPTION FOR POWER4-MODULE

Supply-part

***General** (pos. numbers refer to circuit diagram chapter 11-7)*

The primary circuitry depends on the version:

- Versions with fixed primary voltage: 100VAC for /26
  120VAC for /37
  220-240VAC for /22/25/30/33/34
  Versions /22/25/26/37 use radial type-fuse 1201, versions /30/33/34 use glass tube fuse 1202.
  For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- Version with switchable primary voltage: 110-127/220-240VAC for /21
  In version /21 voltage selector 1210 is built-in and each primary winding is protected separately (fuses 1201 and 1200).
  For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- European versions – *"low power standby feature"*
  For detailed description see below.

Circuit details:

- **Low power standby feature**

An additional small standby transformer, connected in series to the mains transformer, reduces power consumption in standby-mode.
In case power is switched on, the control line ECO is low → relay 1208 is activated → standby transformer 5211 is shortened and out of work.
When the set is switched off (standby) the control line ECO is high → relay 1208 is not activated → standby transformer 5211 is now connected in series to the primary winding of the mains transformer 1008. As the impedance of the standby transformer is much higher than the impedance of the mains transformer, the mainsvoltage is divided by approx. 85% (standby transformer) to 15% (mains transformer). Thus the mains transformer delivers very low secondary voltage → power consumption is less than 100mW.
Via standby transformer and rectifiers 6209-6212 the supply voltage +C is substituted. The 5,6V regulator is still working and so the microprocessor is kept running.

- **DC voltages +A, +B1/+B2, +C**

These voltages supply the Super Class G amplifier, described later in this chapter.
The whole power supply is optimized for the special characteristic of this type of amplifier. For that reason several "tricky" details have been applied to ensure optimal efficiency and symmetrical load to the mains transformer.

Generation of +A

Common full wave rectifying with bridge rectifier 6201, using 100% secondary winding of mains transformer (pin 11-15).

Generation of +B1/+B2

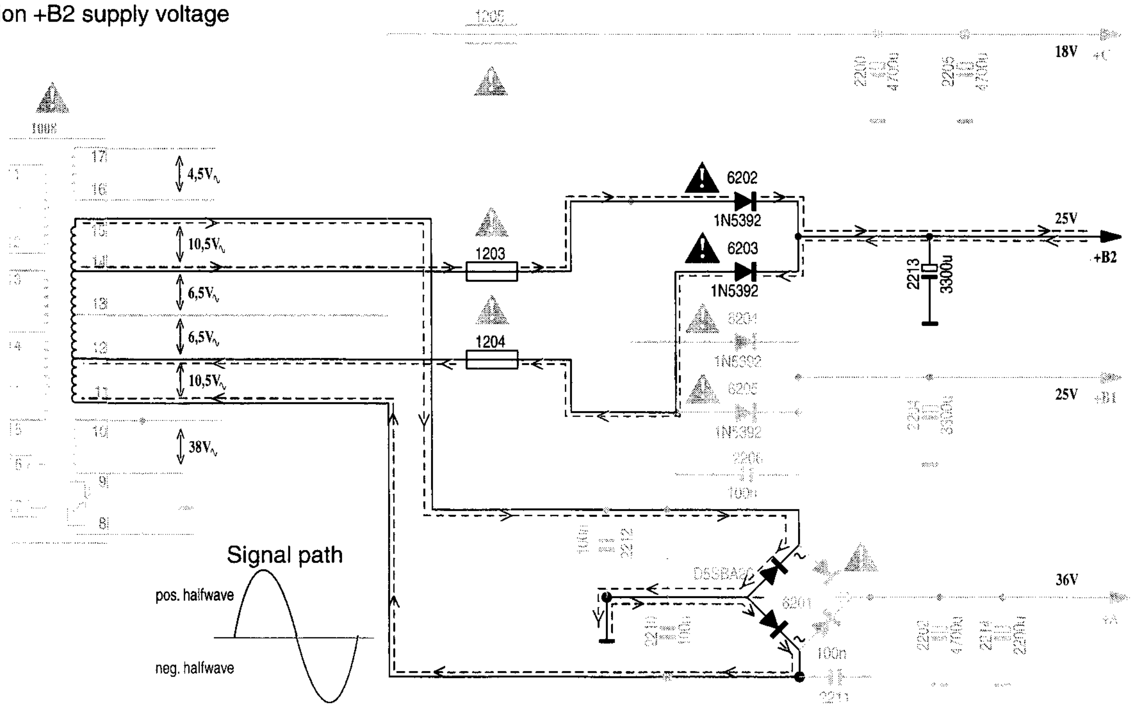
The power supply is designed to cover both, 2-channel and 4-channel application.
While for 2-channel application only one supply voltage +B1 is sufficient, 4-channel application requires an additional supply part +B2 which supplies the Center/Surround-amplifiers and the +12V-regulator (current required by 4 amplifiers would overload a single rectifier).

The supply for 2-channel versions consists of one full wave rectifier:
- 2 diodes of bridge rectifier 6201, with 6204/6205 for generation of +B1
- +B2 is connected in parallel with a bridge wire.

The supply for 4-channel versions consists of two separate full wave rectifiers:
- 2 diodes of bridge rectifier 6201, with 6204/6205 (for +B1) and
- 2 diodes of bridge rectifier 6201, with 6202/6203 (for +B2),

using approx. 70% secondary winding of mains transformer (pin 11-14 respectively pin 12-15).
As example for generation of +B2 see picture 1.

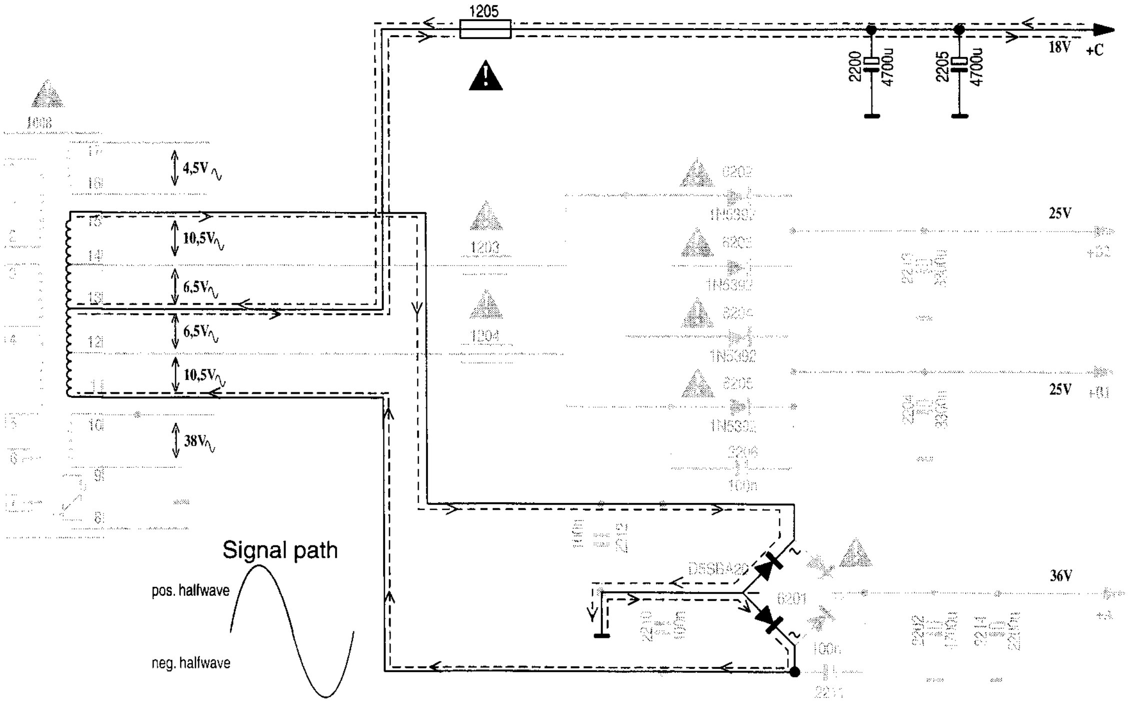
Generation +B2 supply voltage


1205
1008
17
16
15
14
13
12
11
10
9
8
4,5V
10,5V
6,5V
6,5V
10,5V
38V
1203
1204
6202
1N5392
6203
1N5392
6204
1N5392
6205
1N5392
25V
+B2
2213
3300u
25V
+B1
2204
18V
+C
2200
4700u
2205
4700u
2206
100n
2212
D5SBA20
6201
36V
+A
2210
100n
2202
2214
2211
Signal path
pos. halfwave
neg. halfwave

picture 1

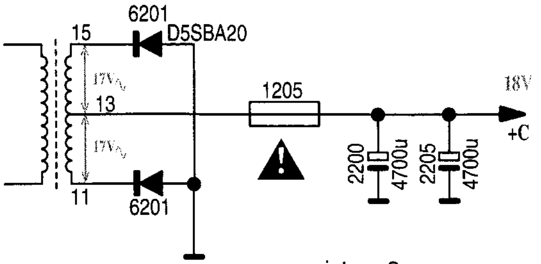
Generation of +C

Full wave rectifying with 2 diodes of bridge rectifier 6201, using 50% secondary winding of mains transformer (pin 13-15/13-11). See pictures 2 and 3 below.


1205
18V
+C
2200
4700u
2205
4700u
1008
17
16
15
14
13
12
11
10
9
8
4,5V
10,5V
6,5V
6,5V
10,5V
38V
1203
1204
6202
1N5392
6203
1N5392
6204
1N5392
6205
1N5392
25V
+B2
2213
3300u
25V
+B1
2204
3300u
2206
100n
2212
D5SBA20
6201
36V
+A
2210
100n
2202
2214
2211
Signal path
pos. halfwave
neg. halfwave

picture 2

Simplified


6201
D5SBA20
15
17V
13
17V
11
6201
1205
18V
+C
2200
4700u
2205
4700u

picture 3

Circuit details (continoued):

- **Supply voltages for FTD** (**F**luorescent **T**ube **D**isplay)
  The FTD requires two supply voltages, delivered by separate windings of the mains transformer:
  - 4,5VAC for FTD heating (transformer pin 16/17)
  - -30V stabilized by the -30V regulator located on the amplifier part. The supply part delivers -35V unstabilized (transformer pin 9/10), typical value: -35V...-45V.

- **Stabilized +5V6**
  Stabilizer 7201 generates the supply voltage +5V6 for the microprocessor. In fault condition the output voltage can rise up to approx. 17V, which would definitely damage the device. Therefore an overvoltage protection for the +5V6 supply is implemented.
  Whenever the output of stabilizer rises above 7,5V, the base of 7202 reaches 0,7V (7,5V - voltage drop on 6207), the transistor switches through and short circuits the input voltage. This causes the safety resistor 3204 to blow out and interrupt immediately.

- **Temperature monitoring**
  The mains transformer is equipped with a NTC, embedded in the secondary winding (pin 8/9). Via the NTC line the temperature of the mains transformer is continuously monitored by the microprocessor. Further actions depend on the software of the set. Usually the set will be switched to standby mode when the transformer is overheated.

- **Power down (PWDN) monitoring**
  In order to enable proper switch off conditions the mains supply is monitored by the microprocessor via the PWDN line. In case of mains supply interrupts the PWDN line becomes low, while the +5V6 is still stable. This enables the microprocessor to take actions for a save shut-down (e.g. mute, reset of electronics, release of head support of tape deck).

Amplifier part

+12V-regulator *(pos. numbers refer to circuit diagram chapter 11-9)*

Is used to supply all motors (+12M) and all analogue circuits (+12A) in the set. +12C is provisional only.

- **Power on/off:**
  Switching on/off is done via the STBY-line from the microprocessor. H=ON, L=OFF
  If the STBY line is high - transistor 7222 is conductive. Base of 7224 becomes less positive than the emitter. This causes transistor 7224 to switch trough and supply the base of 7221. Consequently 7221 swiches trough too.
  Via 3218 transistor 3228 is conductive as soon as B2 is available. Consequently switching transistor 7227 is also switched through.

  If the STBY line is switched to low level base current for 7222 is blocked. In turn 7224 and 7221 are blocked. → OFF.

- **Regulation:**
  Key components are power-transistor 7221, reference diode 6221 and transistor 7223.
  After power is switched on via the STBY line as described above the +12A increases until 7223 becomes conductive via reference diode 6221 → 7223 reduces base current of 7221 → +12A is stable (typical +12,4V).
  In normal operating mode 7227 is always switched trough as described above.

- **Protections:**
  In case of overcurrent (typical 2,5A) 7227 gets out of saturation → 7226 becomes conductive → 7225 becomes conductive via 6225 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.
  Restarting is only possible with power OFF→ ON.

  In case of overvoltage (more than +15V on emitter of 7221) 7225 is now activated via 6233 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.

  These protections are implemented for saving the set-electronic in any fault-condition.

-30V-regulator

- Grid supply for the FTD switched by the microprocessor.
  Simple regulation with 6251 as reference. Typical value: -29V. Maximum current: 30mA

Circuit details (continoued):

Fan-circuit:

Is a provision for versions with not enough cooling-capacity (e.g. MICRO-sets).

There are three modes: (off, low and high) which are controlled by: - an NTC located on the cooling-plate and
- info-line TURBOFAN from the amplifier-supply.

OFF: If NTC 3250 has high resistance, 7236 is conductive → 7237 is blocked → fan is not running.

LOW: When the NTC becomes hot the resistance decreases. At approx. 60°C 7236 blocks. 7237 becomes conductive → fan starts running. The fan is supplied is approx. 8V because divider 3244/3245 keeps base of 7237 at typ. 9V.
3246 works as a hysteresis resistor. Just when the temperature decreases to about 50°C the fan will be switched off.

HIGH: When the set is driven with very high output-levels, +B or even +A is switched as supply voltage to the power stages. Via 6244 the level of the TURBOFAN-line becomes high. Base of 7237 increases and in turn the emitter. This results in a higher fan-speed. The voltage on the fan can rise up to +12V - depending on the music.

Amplifier:

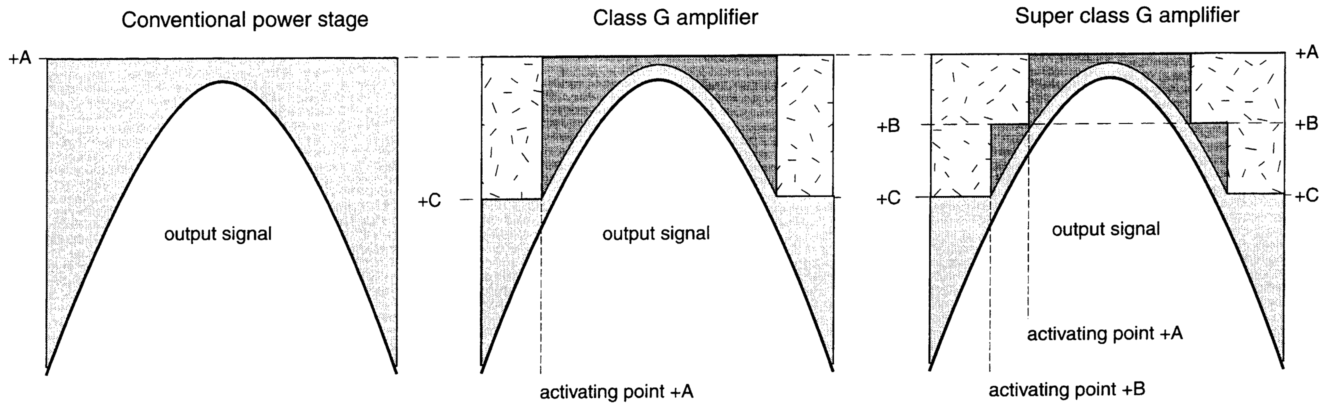
Attention: In the POWER 4 module the power amplifier IC AN7164 is used as a bridge-amplifier.
Any connection from output to ground will destroy the outpout stages!

- Via the AMP_ON control line, connected to pins 6 (Stby), the power amplifiers are switched on/off by the µP.
  High level (approx. 4,5V): power amplifiers switched on
  Low level (approx. 0V): power amplifiers switched off

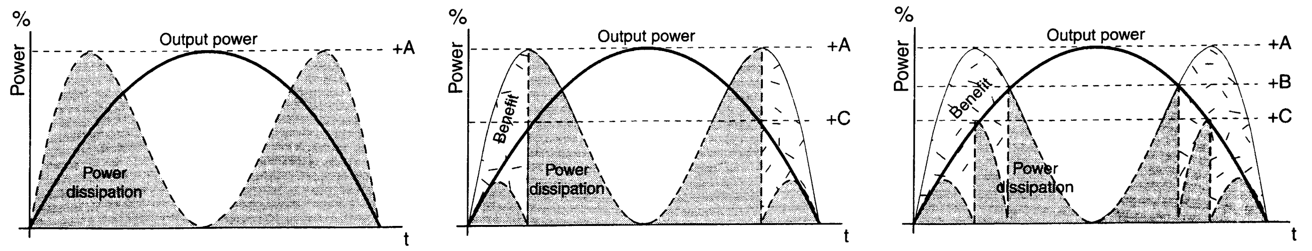
- Super class G - operation

  The power amplifiers operate as so-called super class G - amplifiers:
  The supply pins 12 (Vcc) are not just connected to one fixed DC-supply as in conventional amplifiers.
  Dependent on the output power there are three different DC-voltages supplied to the power amplifiers:
  ⇒ +C (+18V) for low output power
  ⇒ +B (+25V) for medium output power
  ⇒ +A (+36V for high output power

Principle / benefit of Super Class G


Conventional power stage
Class G amplifier
Super class G amplifier

▢ Voltage drop on power stage IC
▨ Voltage drop on switching transistor(s)
⬚ Benefit - voltage drop on switching transistor(s) reduces total power dissipation



- advantages: - best efficiency
  - less power drawn from the mains transformer than by conventional operating amplifiers reduces transformer heating.
  - reduced power dissipation at the amplifier ICs results in
    - less junction temperature and better reliability
    - possibility of higher output power with smaller cooling fin
    - smaller size

- Functional description of the super class G - circiuitry used in Power4-module

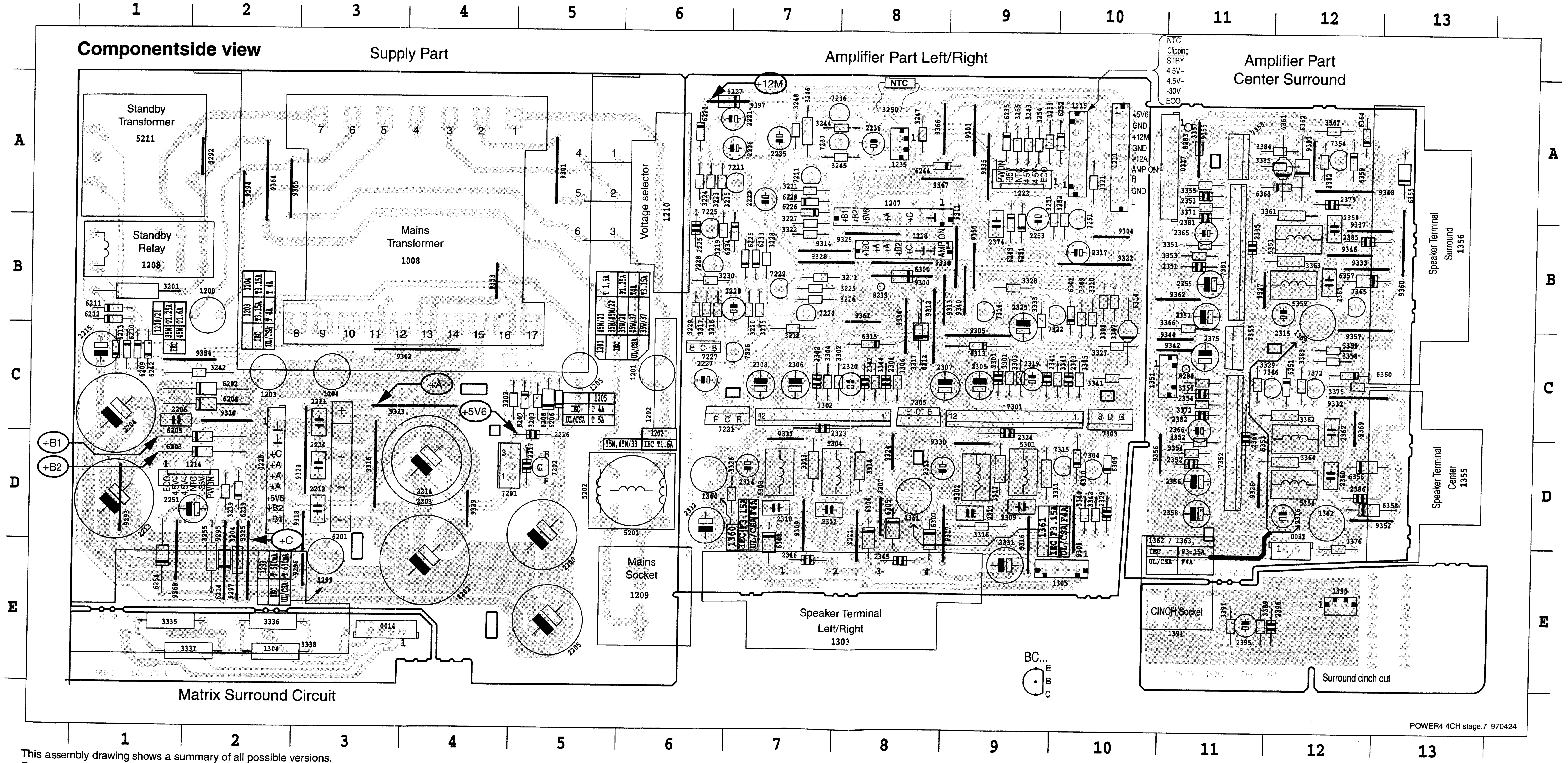
  The DC-level on the amplifier output pins is normally Vcc/2.
  With low signals +C is supplying the amplifiers via decoupling diode 6312. The DC-level on the output pins is therefore approx. 8,6V and approx. 8V on the base of 7315.
  When the output signal increases, also DC-level on base of 7315 increases via diodes 6305, 6306, 6307 and 6308. At a certain output power 7315 becomes slightly conductive and enables low base current for 7304 which becomes conductive too and pulls gate of FET 7303 up to a more positive level. Thus FET 7303 begins to switch through and connects the higher DC supply +B1 slowly to the power stages.
  This does not end up in a hard switching but in a smooth regulating because Vcc is coupled back to the emitter of 7315 via Zener diode 6310. As soon as Vcc increases also the level on emitter 7315 is increased by a 3,9V lower level than Vcc.
  When the output power is increased further +B1 would not be high enough to enable undistorted output signal. The more the output level increases the more increases the DC-level on base of 7315 which causes the transistor more and more conducting until the summary of the voltage drop on 3340+E/B 7304+3342 becomes approx. 1,4V. Now the necessary VBE for a darlington-type transistor is obtained, 7305 begins to switch through and connects the again higher DC supply +A slowly to the power stages. 7305 regulates +A, same as described before for +B.
  7322 and 7316 switch the ripple capacitor 2355, dependent on the output power.
  With low output power the DC-level on base 7322 is approx. 8V. Via Zener diode 6310 and resistor 3333 the emitter is pulled to Vcc (+C at low levels). 7322 is switched through and in turn 7316. The ripple capacitor 2325 is connected to ground and functions as in normal amplifiers. Hum is suppressed and good S/N-ratio is guaranteed even during silent music passages.
  When the supply voltage has to be switched to a higher level the DC-level of the ripple capacitor has to increase in the same relation, otherwise the reference voltages inside the IC would not fit to the actual Vcc. Because of the different delays this relation cannot be obtained and a continuously connected capacitor to the ripple input would cause distortion. For that reason the ripple capacitor 2325 is disconnected as soon as the output power exceeds a certain value. When the output signal increases, also DC-level on base of 7322 increases via diodes 6305, 6306, 6307 and 6308. 7322 blocks and in turn 7316. The ripple capacitor 2325 is disconnected from ground. The circuitry is designed so that 2325 is disconnected just before 7303 begins to switch +B through (see above).

- For Center/Surround-amplifier the function of the Super Class G circuit is similar. Instead of +B1 there +B2 is connected.

- For the /37-versions with two channel-application the so called MATRIX SURROUND is added. The 2 surround-speakers are added in a way, that in case of STEREO a high signal can be measured (up to 10W per speaker at 6 Ohm). In MONO only a few 100mW are available. Result: The widening of the STEREO base is increased without any additional electronic or amplifier.

- In all four channel versions a pre-amplifier out for SURROUND is available to add a wireless speaker system (e.g. FB206,FB208).

0014 E 3	1211 A 10	1362 D 12	2215 C 1	2303 C 10	2319 C 9	2353 A 11	2379 A 12	3218 C 7	3242 C 2	3302 C 8	3321 A 10	3351 B 11	3371 A 11	5303 D 7	6210 C 1	6243 B 9	6314 C 10	7211 A 7	7304 D 10	8284 C 11	9309 D 7	9325 E 2	9342 C 11	9365 A 2
0091 E 12	1214 D 2	1363 B 12	2216 D 5	2304 C 8	2320 C 8	2354 C 11	2381 A 11	3219 B 6	3243 A 9	3303 C 9	3326 D 7	3352 D 11	3372 C 11	5304 D 8	6211 B 1	6244 A 8	6315 C 8	7221 C 7	7305 C 8	9292 A 2	9310 C 2	9326 D 11	9344 C 11	9366 A 8
0225 D 2	1215 A 10	1390 E 12	2217 D 5	2305 C 9	2323 C 7	2355 B 11	2382 C 11	3220 B 7	3244 A 8	3304 C 7	3327 C 10	3353 B 11	3375 C 12	5351 B 12	6212 B 1	6251 B 9	6351 C 12	7222 B 7	7315 D 10	9293 D 1	9311 B 9	9327 B 11	9346 B 12	9367 A 8
0227 A 11	1218 B 8	1391 E 11	2221 A 7	2306 C 7	2324 C 9	2356 D 11	2385 B 12	3221 B 7	3245 A 8	3305 C 10	3328 B 9	3354 D 11	3376 E 12	5352 B 12	6213 C 1	6252 A 10	6355 A 13	7223 A 7	7316 B 9	9294 A 2	9312 B 8	9328 B 7	9348 A 12	9368 E 1
1008 A 4	1222 A 9	2200 D 5	2222 A 7	2307 C 8	2325 B 9	2357 B 11	2386 D 12	3222 B 7	3246 A 7	3306 C 8	3329 C 11	3355 A 11	3382 A 12	5353 C 12	6214 E 2	6254 E 1	6356 D 12	7224 B 7	7322 B 9	9295 E 2	9313 B 8	9329 B 8	9350 B 9	9369 C 12
1200 B 2	1235 A 8	2202 E 4	2225 B 6	2308 C 7	2329 D 10	2358 D 11	2395 E 11	3223 A 6	3247 A 8	3307 B 10	3333 B 9	3356 C 11	3383 C 12	5354 D 12	6221 A 6	6300 B 8	6357 B 12	7225 B 6	7351 B 11	9296 E 3	9314 B 7	9330 D 9	9352 D 12	9393 A 12
1201 C 6	1299 E 3	2203 D 4	2226 A 7	2309 D 9	2331 E 9	2359 B 12	2396 E 12	3224 A 6	3248 A 7	3308 B 10	3335 E 1	3357 A 11	3384 A 12	6201 D 3	6225 B 7	6301 B 10	6358 D 12	7226 C 7	7352 D 11	9297 E 2	9315 D 3	9331 D 7	9353 B 4	9397 A 6
1202 C 6	1303 E 8	2204 C 1	2227 C 6	2310 D 7	2332 D 6	2360 D 12	3201 B 1	3225 B 7	3250 A 8	3309 B 10	3336 E 2	3358 C 12	3385 A 12	6202 C 2	6226 A 7	6305 D 8	6359 A 12	7227 C 6	7353 A 11	9300 B 8	9316 E 9	9332 C 12	9354 C 2	
1203 C 2	1304 E 2	2205 E 5	2228 B 7	2311 D 9	2335 B 11	2361 B 12	3202 C 5	3226 B 7	3251 A 9	3310 B 10	3337 E 2	3359 C 12	3389 E 11	6203 D 2	6227 A 6	6306 D 8	6360 C 12	7228 B 6	7354 A 12	9301 A 5	9317 D 9	9333 B 12	9355 A 11	
1204 C 3	1305 E 10	2206 C 1	2235 A 7	2312 D 7	2341 C 9	2362 C 12	3203 C 5	3227 B 7	3252 B 10	3311 D 9	3338 E 2	3361 A 12	3391 E 11	6204 C 2	6228 A 7	6307 D 8	6361 A 12	7236 A 7	7355 C 11	9302 C 4	9318 E 3	9335 A 9	9356 D 10	
1205 C 5	1351 C 11	2210 D 3	2236 A 8	2313 D 8	2342 C 8	2364 D 11	3204 E 2	3228 B 7	3253 A 9	3312 D 9	3340 D 10	3362 C 12	5201 D 6	6205 D 2	6233 B 7	6308 E 7	6362 A 12	7237 A 7	7365 B 12	9303 A 9	9320 D 3	9336 B 8	9357 B 12	
1207 B 8	1355 D 13	2211 C 3	2251 D 2	2314 D 7	2345 E 8	2365 B 11	3211 A 7	3229 B 6	3254 A 9	3313 D 7	3341 C 10	3363 B 12	5202 D 6	6206 C 5	6234 B 7	6309 D 10	6363 A 12	7251 A 10	7366 C 12	9304 B 10	9321 D 8	9337 B 12	9360 B 13	
1208 B 1	1356 B 13	2212 D 3	2253 A 9	2315 B 12	2346 E 7	2366 C 11	3215 B 7	3230 B 6	3255 E 2	3314 D 8	3342 D 10	3364 D 12	5211 A 1	6207 C 5	6235 A 9	6310 D 10	6364 A 12	7301 C 9	7372 C 12	9305 C 9	9322 B 10	9338 B 8	9361 B 8	
1209 E 6	1360 D 6	2213 D 1	2301 C 9	2316 D 12	2351 B 11	2374 B 9	3216 B 6	3235 A 6	3256 A 9	3316 D 9	3343 C 10	3366 B 11	5301 D 9	6208 C 5	6239 D 2	6312 C 8	7201 D 4	7302 C 7	8233 B 8	9307 D 8	9323 C 4	9339 D 4	9362 B 11	
1210 A 5	1361 D 8	2214 D 4	2302 C 7	2317 B 10	2352 D 11	2375 C 11	3217 B 6	3239 D 2	3301 C 9	3317 C 8	3344 C 8	3367 A 12	5302 D 9	6209 C 1	6242 C 1	6313 C 9	7202 D 5	7303 C 10	8283 A 11	9308 D 10	9324 D 8	9340 B 9	9364 A 2	


1
2
3
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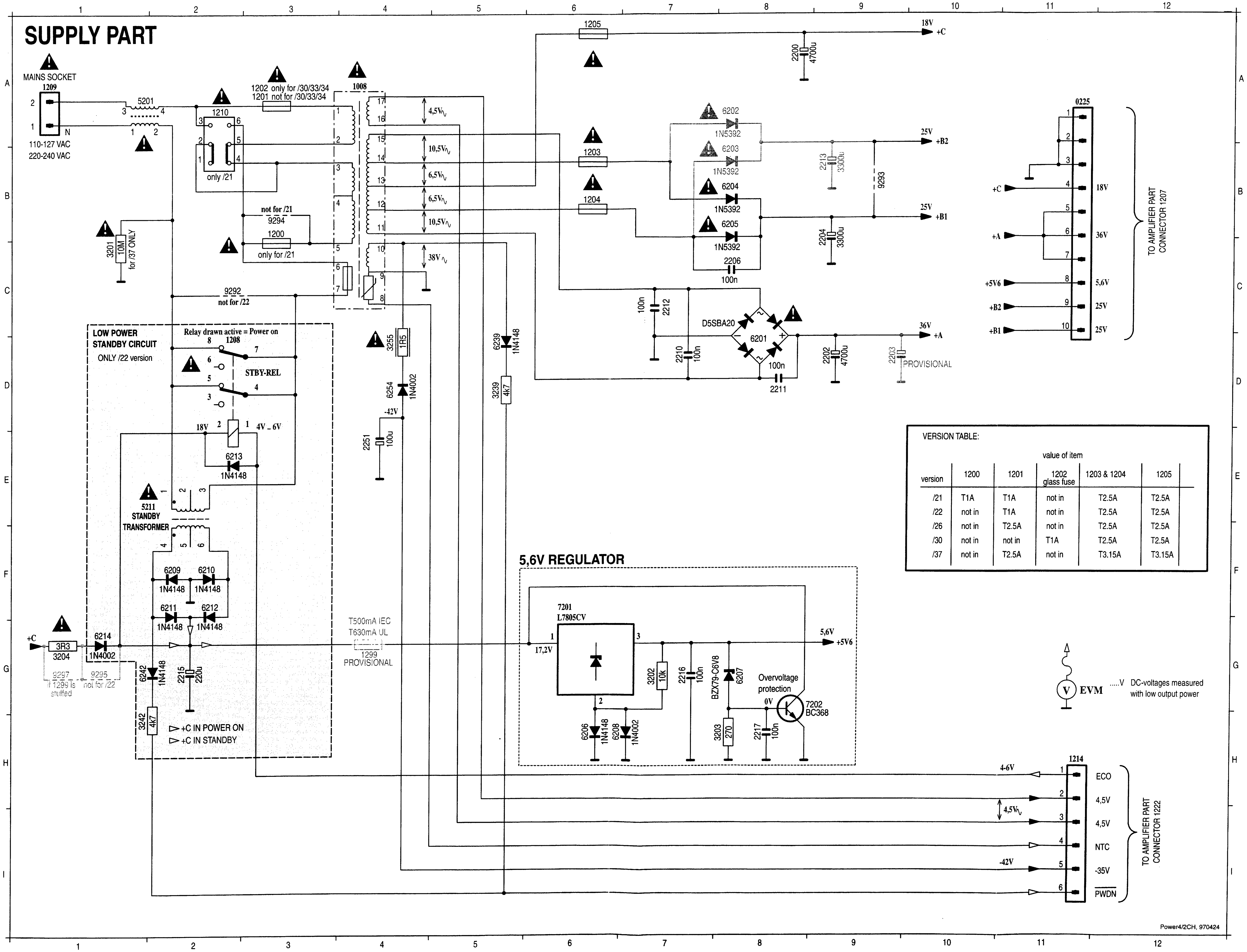
7
8
9
10
11
12
13
A
B
C
D
E
Componentside view
Supply Part
Amplifier Part Left/Right
Amplifier Part Center Surround
NTC
Clipping
STBY
4,5V~
4,5V~
-30V
ECO
Standby Transformer
5211
Standby Relay
1208
Mains Transformer
1008
Voltage selector
1210
Mains Socket
1209
+12M
+A
+5V6
+B1
+B2
+C
+5V6
GND
+12M
GND
+12A
AMP ON
R
GND
L
Speaker Terminal Left/Right
1303
Speaker Terminal Surround
1356
Speaker Terminal Center
1355
CINCH Socket
1391
Surround cinch out
Matrix Surround Circuit
BC...
E
B
C
POWER4 4CH stage.7 970424

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

SUPPLY PART

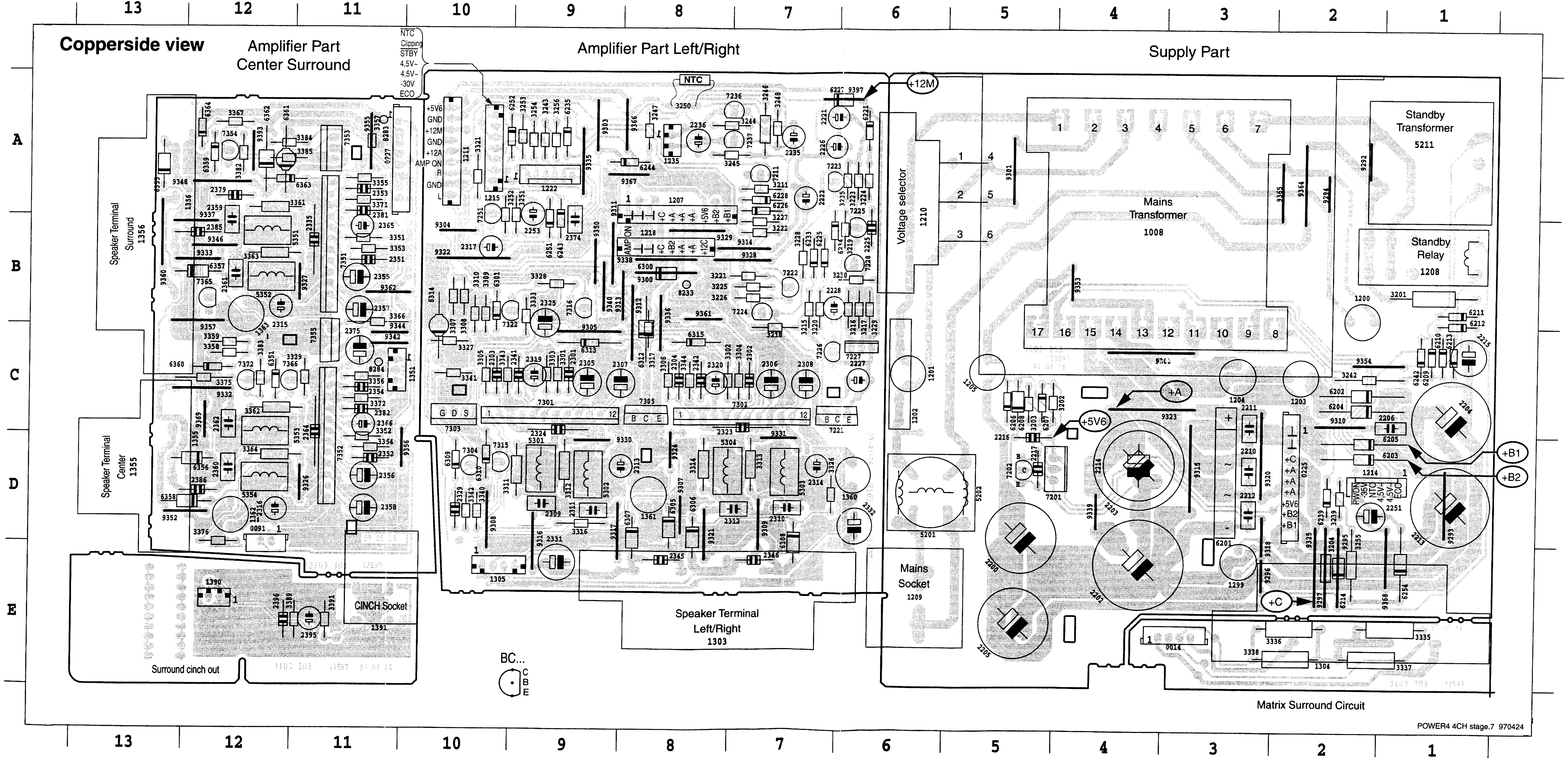

MAINS SOCKET
1209
110-127 VAC
220-240 VAC
5201
1210
only /21
1202 only for /30/33/34
1201 not for /30/33/34
1008
not for /21
9294
1200
only for /21
3201
10M
for /37 ONLY
9292
not for /22
4,5V
10,5V
6,5V
6,5V
10,5V
38V
1205
18V
+C
2200
4700u
6202
1N5392
6203
1N5392
6204
1N5392
6205
1N5392
2206
100n
1203
1204
25V
+B2
25V
+B1
2213
3300u
9293
2204
3300u
2212
100n
D5SBA20
6201
2210
100n
2211
100n
36V
+A
2202
4700u
2203
PROVISIONAL
0225
+C
18V
+A
36V
+5V6
5,6V
+B2
25V
+B1
25V
TO AMPLIFIER PART CONNECTOR 1207
3255
1R5
6254
1N4002
-42V
2251
100u
6239
1N4148
3239
4k7
LOW POWER STANDBY CIRCUIT
ONLY /22 version
Relay drawn active = Power on
1208
STBY-REL
18V
4V .. 6V
6213
1N4148
5211
STANDBY TRANSFORMER
6209
1N4148
6210
1N4148
6211
1N4148
6212
1N4148
+C
3R3
3204
6214
1N4002
9297
if 1299 is stuffed
9295
not for /22
6242
1N4148
2215
220u
3242
4k7
+C IN POWER ON
+C IN STANDBY
T500mA IEC
T630mA UL
1299
PROVISIONAL
5,6V REGULATOR
7201
L7805CV
17,2V
5,6V
+5V6
3202
10k
2216
100n
BZX79-C6V8
6207
Overvoltage protection
0V
7202
BC368
6206
1N4148
6208
1N4002
3203
270
2217
100n
EVM
.....V DC-voltages measured with low output power
1214
4-6V
ECO
4,5V
4,5V
4,5V
NTC
-42V
-35V
PWDN
TO AMPLIFIER PART CONNECTOR 1222
Power4/2CH, 970424

VERSION TABLE:

version	value of item 1200	1201	1202 glass fuse	1203 & 1204	1205
/21	T1A	T1A	not in	T2.5A	T2.5A
/22	not in	T1A	not in	T2.5A	T2.5A
/26	not in	T2.5A	not in	T2.5A	T2.5A
/30	not in	not in	T1A	T2.5A	T2.5A
/37	not in	T2.5A	not in	T3.15A	T3.15A

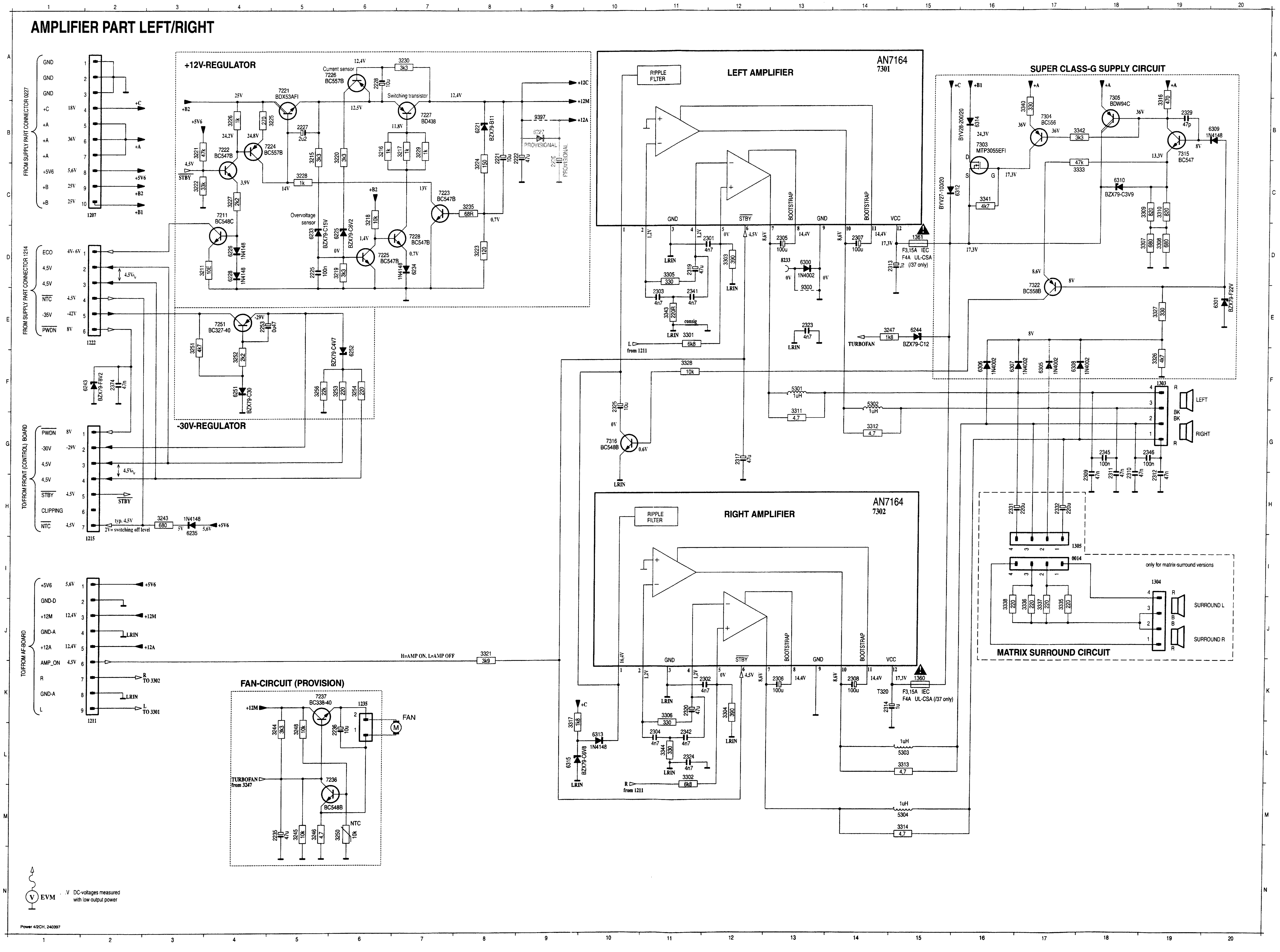
0225	A11
1008	A 4
1200	B 3
1201	A 3
1202	A 3
1203	B 6
1204	B 6
1205	A 6
1208	D 2
1209	B 1
1210	A 2
1214	I11
2200	A 8
2202	D 9
2203	D 9
2204	B 9
2206	C 8
2210	D 7
2211	D 8
2212	C 7
2213	B 9
2215	G 2
2216	G 7
2217	H 8
2251	E 4
3201	C 1
3202	G 7
3203	H 8
3204	G 1
3239	D 5
3242	H 1
3255	D 4
5201	A 1
5211	E 1
6201	C 8
6202	A 8
6203	A 8
6204	B 8
6205	B 8
6206	H 6
6207	G 8
6208	H 7
6209	F 2
6210	F 2
6211	F 2
6212	F 2
6213	E 2
6214	G 1
6239	D 5
6242	G 1
6254	D 4
7201	F 6
7202	G 9
9292	C 2
9293	B 9
9294	B 3
9295	F 4

0014 E 3	1211 A 10	1362 D 12	2215 C 1	2303 C 10	2319 C 9	2353 A 11	2379 A 12	3218 C 7	3242 C 2	3302 C 8	3321 A 10	3351 B 11	3371 A 11	5303 D 7	6210 C 1	6243 B 9	6314 C 10	7211 A 7	7304 D 10	8284 C 11	9309 D 7	9325 E 2	9342 C 11	9365 A 2
0091 E 12	1214 D 2	1363 B 12	2216 D 5	2304 C 8	2320 C 8	2354 C 11	2381 A 11	3219 B 6	3243 A 9	3303 C 9	3326 D 7	3352 D 11	3372 C 11	5304 D 8	6211 B 1	6244 A 8	6315 C 8	7221 C 7	7305 C 8	9292 A 2	9310 C 2	9326 D 11	9344 C 11	9366 A 8
0225 D 2	1215 A 10	1390 E 12	2217 D 5	2305 C 9	2323 C 7	2355 B 11	2382 C 11	3220 B 7	3244 A 8	3304 C 7	3327 C 10	3353 B 11	3375 C 12	5351 B 12	6212 B 1	6251 B 9	6351 C 12	7222 B 7	7315 D 10	9293 D 1	9311 B 9	9327 B 11	9346 B 12	9367 A 8
0227 A 11	1218 B 8	1391 E 11	2221 A 7	2306 C 7	2324 C 9	2356 D 11	2385 B 12	3221 B 7	3245 A 8	3305 C 10	3328 B 9	3354 D 11	3376 E 12	5352 B 12	6213 C 1	6252 A 10	6355 A 13	7223 A 7	7316 B 9	9294 A 2	9312 B 8	9328 B 7	9348 A 12	9368 E 1
1008 A 4	1222 A 9	2200 D 5	2222 A 7	2307 C 8	2325 B 9	2357 B 11	2386 D 12	3222 B 7	3246 A 7	3306 C 8	3329 C 11	3355 A 11	3382 A 12	5353 C 12	6214 E 2	6254 E 1	6356 D 12	7224 B 7	7322 B 9	9295 E 2	9313 B 8	9329 B 8	9350 B 9	9369 C 12
1200 B 2	1235 A 8	2202 E 4	2225 B 6	2308 C 7	2329 D 10	2358 D 11	2395 E 11	3223 A 6	3247 A 8	3307 B 10	3333 B 9	3356 C 11	3383 C 12	5354 D 12	6221 A 6	6300 B 8	6357 B 12	7225 B 6	7351 B 11	9296 E 3	9314 B 7	9330 D 9	9352 D 12	9393 A 12
1201 C 6	1299 E 3	2203 D 4	2226 A 7	2309 D 9	2331 E 9	2359 B 12	2396 E 12	3224 A 6	3248 A 7	3308 B 10	3335 E 1	3357 A 11	3384 A 12	6201 D 3	6225 B 7	6301 B 10	6358 D 12	7226 C 7	7352 D 11	9297 E 2	9315 D 3	9331 D 7	9353 B 4	9397 A 6
1202 C 6	1303 E 8	2204 C 1	2227 C 6	2310 D 7	2332 D 6	2360 D 12	3201 B 1	3225 B 7	3250 A 8	3309 B 10	3336 E 2	3358 C 12	3385 A 12	6202 C 2	6226 A 7	6305 D 8	6359 A 12	7227 C 6	7353 A 11	9300 B 8	9316 E 9	9332 C 12	9354 C 2	
1203 C 2	1304 E 2	2205 E 5	2228 B 7	2311 D 9	2335 B 11	2361 B 12	3202 C 5	3226 B 7	3251 A 9	3310 B 10	3337 E 2	3359 C 12	3389 E 11	6203 D 2	6227 A 6	6306 D 8	6360 C 12	7228 B 6	7354 A 12	9301 A 5	9317 D 9	9333 B 12	9355 A 11	
1204 C 3	1305 E 10	2206 C 1	2235 A 7	2312 D 7	2341 C 9	2362 C 12	3203 C 5	3227 B 7	3252 B 10	3311 D 9	3338 E 2	3361 A 12	3391 E 11	6204 C 2	6228 A 7	6307 D 8	6361 A 12	7236 A 7	7355 C 11	9302 C 4	9318 E 3	9335 A 9	9356 D 10	
1205 C 5	1351 C 11	2210 D 3	2236 A 8	2313 D 8	2342 C 8	2364 D 11	3204 E 2	3228 B 7	3253 A 9	3312 D 9	3340 D 10	3362 C 12	5201 D 6	6205 D 2	6233 B 7	6308 E 7	6362 A 12	7237 A 7	7365 B 12	9303 A 9	9320 D 3	9336 B 8	9357 B 12	
1207 B 8	1355 D 13	2211 C 3	2251 D 2	2314 D 7	2345 E 8	2365 B 11	3211 A 7	3229 B 6	3254 A 9	3313 D 7	3341 C 10	3363 B 12	5202 D 6	6206 C 5	6234 B 7	6309 D 10	6363 A 12	7251 A 10	7366 C 12	9304 B 10	9321 D 8	9337 B 12	9360 B 13	
1208 B 1	1356 B 13	2212 D 3	2253 A 9	2315 B 12	2346 E 7	2366 C 11	3215 B 7	3230 B 6	3255 E 2	3314 D 8	3342 D 10	3364 D 12	5211 A 1	6207 C 5	6235 A 9	6310 D 10	6364 A 12	7301 C 9	7372 C 12	9305 C 9	9322 B 10	9338 B 8	9361 B 8	
1209 E 6	1360 D 6	2213 D 1	2301 C 9	2316 D 12	2351 B 11	2374 B 9	3216 B 6	3235 A 6	3256 A 9	3316 D 9	3343 C 10	3366 B 11	5301 D 9	6208 C 5	6239 D 2	6312 C 8	7201 D 4	7302 C 7	8233 B 8	9307 D 8	9323 C 4	9339 D 4	9362 B 11	
1210 A 5	1361 D 8	2214 D 4	2302 C 7	2317 B 10	2352 D 11	2375 C 11	3217 B 6	3239 D 2	3301 C 9	3317 C 8	3344 C 8	3367 A 12	5302 D 9	6209 C 1	6242 C 1	6313 C 9	7202 D 5	7303 C 10	8283 A 11	9308 D 10	9324 D 8	9340 B 9	9364 A 2	


13
12
11
10
9
8
7
6
5
4
3
2
1
A
B
C
D
E
Copperside view
Amplifier Part Center Surround
NTC
Clipping
STBY
4,5V~
4,5V~
-30V
ECO
Amplifier Part Left/Right
Supply Part
Speaker Terminal Surround 1356
Speaker Terminal Center 1355
Surround cinch out
CINCH Socket
1391
1390
+5V6
GND
+12M
GND
+12A
AMP ON
R
GND
L
NTC
+12M
Voltage selector
1210
Mains Transformer
1008
Standby Transformer
5211
Standby Relay
1208
+A
+5V6
+B1
+B2
+C
Mains Socket
1209
Speaker Terminal Left/Right
1303
BC...
C
B
E
Matrix Surround Circuit
POWER4 4CH stage.7 970424

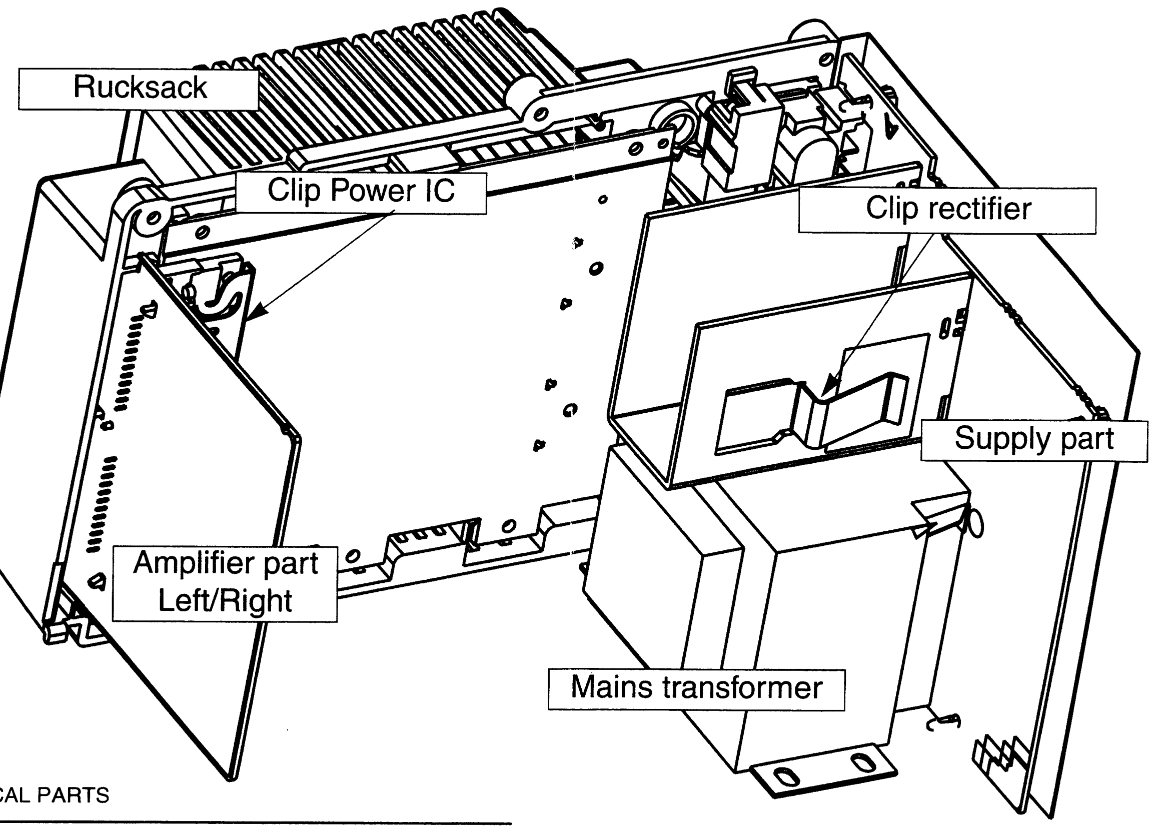
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

AMPLIFIER PART LEFT/RIGHT


+12V-REGULATOR
-30V-REGULATOR
LEFT AMPLIFIER
AN7164
7301
RIGHT AMPLIFIER
AN7164
7302
RIPPLE FILTER
SUPER CLASS-G SUPPLY CIRCUIT
MATRIX SURROUND CIRCUIT
only for matrix-surround versions
FAN-CIRCUIT (PROVISION)
FAN
FROM SUPPLY PART CONNECTOR 0227
FROM SUPPLY PART CONNECTOR 1214
TO/FROM FRONT (CONTROL) BOARD
TO/FROM AF-BOARD
GND
+C
+A
+5V6
+B
ECO
4,5V
NTC
-35V
PWDN
-30V
STBY
CLIPPING
GND-D
+12M
GND-A
+12A
AMP_ON
R
L
1207
1222
1215
1211
1235
1303
1304
1305
0014
+12C
+12M
+12A
+B2
+B1
Current sensor
7226 BC557B
7221 BDX53AFI
Switching transistor
7227 BD438
7222 BC547B
7224 BC557B
7211 BC548C
7223 BC547B
7225 BC547B
7228 BC547B
Overvoltage sensor
7251 BC327-40
9397
6227 PROVISIONAL
2226 PROVISIONAL
7303 MTP3055EFI
7304 BC556
7305 BDW94C
7315 BC547
7322 BC558B
7316 BC548B
7237 BC338-40
7236 BC548B
NTC
GND
STBY
BOOTSTRAP
VCC
F3,15A IEC
F4A UL-CSA (/37 only)
TURBOFAN
from 3247
L from 1211
R from 1211
H=AMP ON, L=AMP OFF
typ. 4,5V
2V= switching off level
LEFT
RIGHT
SURROUND L
SURROUND R
BK
LRIN
EVM
V DC-voltages measured with low output power
Power 4/2CH. 240397

0014	I17
1207	C 2
1211	K 2
1215	I 2
1222	D 2
1235	L 6
1303	G19
1304	I19
1305	I17
1360	K15
1361	D15
2221	B 8
2222	B 9
2225	D 5
2226	B 9
2227	B 5
2228	A 6
2235	N 5
2236	L 6
2253	E 4
2301	D12
2302	K12
2303	E11
2304	L11
2305	D13
2306	K13
2307	D14
2308	K14
2309	H18
2310	H18
2311	H18
2312	H19
2313	D15
2314	K15
2317	G12
2319	D11
2320	K11
2323	E13
2324	L11
2325	F10
2329	B19
2331	H17
2332	H17
2341	E11
2342	L11
2345	G18
2346	G19
2374	F 2
3211	D 3
3215	B 5
3216	B 6
3217	B 7
3218	C 6
3219	D 6
3220	B 6
3221	B 3
3222	C 3
3223	D 8
3224	B 8
3225	B 4
3226	B 4
3227	C 4
3228	C 5
3229	B 7
3230	A 7
3235	C 8
3243	I 2
3244	L 5
3245	N 5
3246	N 5
3247	E14
3248	L 5
3250	N 6
3251	E 3
3252	F 4
3253	F 5
3254	F 6
3256	F 5
3301	E11
3302	L11
3303	D12
3304	K12
3305	D11
3306	K11
3307	D19
3308	D19
3309	C19
3310	C19
3311	G13
3312	G14
3313	L15
3314	M15
3316	B19
3317	L10
3321	J 8
3326	F19
3327	E19
3328	F11
3333	C18
3335	J17
3336	J17
3337	J17
3338	J16
3340	B17
3341	C16
3342	B18
3343	E11
3344	L11
5301	F13
5302	F14
5303	L15
5304	M15
6221	B 8
6225	D 6
6226	D 4
6227	B 9
6228	D 4
6233	D 5
6234	D 7
6235	H 3
6243	F 1
6244	E15
6251	F 4
6252	F 5
6300	D13
6301	E20
6305	F17
6306	F16
6307	F17
6308	F18
6309	B20
6310	C18
6312	C16
6313	L10
6314	B16
6315	L 9
7211	C 4
7221	A 5
7222	B 3
7223	C 7
7224	B 4
7225	D 6
7226	A 5
7227	B 7
7228	D 7
7236	M 6
7237	L 5
7251	E 3
7301	A15
7302	H15
7303	B16
7304	B17
7305	B18
7315	B19
7316	G10
7322	E17
8233	D13
9285	K17
9286	K17
9287	L17
9288	L17
9289	L17
9290	M17
9300	E13
9397	B 9

PARTSLIST POWER4 MODULE



MECHANICAL PARTS

4822 492 11068	CLIP RECTIFIER
4822 492 11395	CLIP POWER-IC
4822 255 40179	CLIP TO220
4822 600 10662	RUCKSACK not for /37
4822 600 10661	RUCKSACK for /37 only

ELECTRICAL PARTSLIST POWER4 MODULE

MISCELLANEOUS

1200	4822 071 51002	FUSE T1A
1201	4822 071 51002	FUSE T1A .... not for /37
1201	4822 253 50137	FUSE T 2,5A UL................. for /37 only
1202	4822 252 11224	FUSE T1A
1203	4822 071 52502	FUSE T 2,5A .... not for /37
1203	4822 252 51121	FUSE T3,15A UL................ for /37 only
1204	4822 071 52502	FUSE T 2,5A .... not for /37
1204	4822 252 51121	FUSE T3,15A UL................ for /37 only
1205	4822 071 52502	FUSE T 2,5A .... not for /37
1205	4822 252 51121	FUSE T3,15A UL................ for /37 only
1208	4822 280 80777	RELAY .... for /22 only
1209	4822 265 31015	MAINS SOCKET .... not for /37
1209	4822 265 31016	MAINS SOCKET................. for /37 only
1210	4822 272 10269	VOLTAGE SELECTOR ...... for /21 only
1303	4822 267 31176	SPEAKER TERMINAL
1360	4822 252 11225	FUSE F3.15A IEC 250V....... not for /37
1360	4822 252 11226	FUSE F4A UL/CSA 250V ... for /37 only
1361	4822 252 11225	FUSE F3.15A IEC 250V....... not for /37
1361	4822 252 11226	FUSE F4A UL/CSA 250V ... for /37 only
5211	4822 146 10756	TRANSFORMER STANDBY.. for /22 only

CAPACITORS

2200	4822 124 80103	4700µF	20%	25V
2202	4822 124 80415	4700µF	20%	50V
2204	4822 124 42367	3300µF	20%	35V
2206	5322 121 42386	100nF	5%	63V
2210	5322 121 42386	100nF	5%	63V

CAPACITORS

2211	5322 121 42386	100nF	5%	63V
2212	5322 121 42386	100nF	5%	63V
2215	4822 124 22263	220µF	20%	25V
2216	4822 126 12882	100nF	20%	50V
2217	4822 126 12882	100nF	20%	50V
2221	4822 124 41579	10µF	20%	50V
2222	4822 124 40433	47µF	20%	25V
2227	4822 124 41576	2,2µF	20%	50V
2228	4822 124 41579	10µF	20%	50V
2251	4822 124 40255	100µF	20%	50V
2253	4822 124 41407	0,47µF	20%	63V
2301	4822 126 11714	4,7nF	20%	16V
2302	4822 126 11714	4,7nF	20%	16V
2303	4822 126 11714	4,7nF	20%	16V
2304	4822 126 11714	4,7nF	20%	16V
2305	4822 124 81029	100µF	20%	25V
2306	4822 124 81029	100µF	20%	25V
2307	4822 124 81029	100µF	20%	25V
2308	4822 124 81029	100µF	20%	25V
2309	4822 121 43526	47nF	5%	100V
2310	4822 121 43526	47nF	5%	100V
2311	4822 121 43526	47nF	5%	100V
2312	4822 121 43526	47nF	5%	100V
2313	4822 124 40242	1µF	20%	63V
2314	4822 124 40242	1µF	20%	63V

ELECTRICAL PARTSLIST POWER4 MODULE

CAPACITORS

2317	4822 124 40433	47µF	20%	25V
2319	4822 124 40433	47µF	20%	25V
2320	4822 124 40433	47µF	20%	25V
2323	4822 126 11714	4,7nF	20%	16V
2324	4822 126 11714	4,7nF	20%	16V
2325	4822 124 41579	10µF	20%	50V
2329	4822 122 33848	47pF	5%	50V
2331	4822 124 41992	220µF		35V
2332	4822 124 41992	220µF		35V
2341	4822 126 11714	4,7nF	20%	16V
2342	4822 126 11714	4,7nF	20%	16V
2345	4822 126 12882	100nF	20%	50V
2346	4822 126 12882	100nF	20%	50V
2374	4822 121 43526	47nF	5%	100V

RESISTORS

3201	4822 053 21106	10MΩ	5%	0,5W
3202	4822 116 83864	10kΩ	5%	0,5W
3203	4822 116 83876	270Ω	5%	0.16W
3204	4822 052 10338	3,3Ω		NFR25
3211	4822 116 52176	10Ω	5%	0,5W
3215	4822 116 52269	3,3kΩ	5%	0,5W
3216	4822 050 11002	1kΩ	5%	0,2W
3217	4822 050 11002	1kΩ	5%	0,2W
3218	4822 116 83864	10kΩ	5%	0,5W
3219	4822 116 52269	3,3kΩ	5%	0,5W
3220	4822 116 52269	3,3kΩ	5%	0,5W
3221	4822 116 83884	47kΩ	5%	0,16W
3222	4822 116 52271	33kΩ	5%	0,16W
3223	4822 116 52206	120Ω	5%	0,5W
3224	4822 116 83868	150Ω	5%	0,5W
3225	4822 116 83876	270Ω	5%	0.16W
3226	4822 050 11002	1kΩ	5%	0,2W
3227	4822 116 52256	2,2kΩ	5%	0,16W
3228	4822 050 11002	1kΩ	5%	0,2W
3229	4822 050 11002	1kΩ	5%	0,2W
3230	4822 116 52269	3,3kΩ	5%	0,5W
3235	4822 116 52199	68Ω	5%	0,16W
3239	4822 116 52283	4,7kΩ	5%	0,5W
3242	4822 116 52283	4,7kΩ	5%	0,5W
3243	4822 116 52228	680Ω	5%	0,5W
3251	4822 116 52283	4,7kΩ	5%	0,5W
3252	4822 116 52256	2,2kΩ	5%	0,16W
3253	4822 116 83872	220Ω	5%	0,5W
3254	4822 116 83872	220Ω	5%	0,5W
3255	4822 117 12148	1,5Ω	5%	
3256	4822 116 52257	22kΩ	5%	0,5W
3301	4822 116 83961	6,8kΩ	5%	0,16W
3302	4822 116 83961	6,8kΩ	5%	0,16W
3303	4822 116 83881	390Ω	5%	0,5W
3304	4822 116 83881	390Ω	5%	0,5W
3305	4822 116 52219	330Ω	5%	0,5W
3306	4822 116 52219	330Ω	5%	0,5W
3307	4822 116 52228	680Ω	5%	0,5W
3308	4822 116 52228	680Ω	5%	0,5W
3309	4822 116 52231	820Ω	5%	0,5W
3310	4822 116 52231	820Ω	5%	0,5W
3311	4822 050 24708	4,7Ω	1%	0,6W
3312	4822 050 24708	4,7Ω	1%	0,6W
3313	4822 050 24708	4,7Ω	1%	0,6W
3314	4822 050 24708	4,7Ω	1%	0,6W

RESISTORS

3316	4822 116 83883	470Ω	5%	0,16W
3317	4822 116 52249	1,8kΩ	5%	0,16W
3321	4822 116 52276	3,9kΩ	5%	0,5W
3326	4822 116 52283	4,7kΩ	5%	0,5W
3327	4822 116 52219	330Ω	5%	0,5W
3328	4822 116 83864	10kΩ	5%	0,5W
3333	4822 116 83884	47kΩ	5%	0,16W
3335	4822 053 10221	220Ω	5%	1W
3336	4822 053 10221	220Ω	5%	1W
3337	4822 053 10221	220Ω	5%	1W
3338	4822 053 10221	220Ω	5%	1W
3340	4822 116 52219	330Ω	5%	0,5W
3341	4822 116 52283	4,7kΩ	5%	0,5W
3342	4822 116 52269	3,3kΩ	5%	0,5W
3343	4822 116 83872	220Ω	5%	0,5W
3344	4822 116 83872	220Ω	5%	0,5W

COILS

5201	4822 157 71285	400µH
5301	4822 157 62255	COIL 18,5 TURNS
5302	4822 157 62255	COIL 18,5 TURNS
5303	4822 157 62255	COIL 18,5 TURNS
5304	4822 157 62255	COIL 18,5 TURNS

DIODES

6201	4822 130 82078	D5SBA20
6204	5322 130 80686	1N5392
6205	5322 130 80686	1N5392
6206	4822 130 30621	1N4148
6207	4822 130 34278	BZX79-C6V8
6208	4822 130 31878	1N4003G
6209	4822 130 30621	1N4148
6210	4822 130 30621	1N4148
6211	4822 130 30621	1N4148
6212	4822 130 30621	1N4148
6213	4822 130 30621	1N4148
6214	4822 130 31878	1N4003G
6221	4822 130 34488	BZX79-C11
6225	4822 130 34382	BZX79-C8V2
6226	4822 130 30621	1N4148
6228	4822 130 30621	1N4148
6233	4822 130 34281	BZX79-C15
6234	4822 130 30621	1N4148
6235	4822 130 30621	1N4148
6239	4822 130 30621	1N4148
6242	4822 130 30621	1N4148
6243	4822 130 34382	BZX79-C8V2
6251	4822 130 34328	BZX79-C30
6252	4822 130 34174	BZX79-B4V7
6254	4822 130 31878	1N4003G
6300	4822 130 31878	1N4003G
6301	4822 130 34441	BZX79-F22
6305	4822 130 31878	1N4003G
6306	4822 130 31878	1N4003G
6307	4822 130 31878	1N4003G
6308	4822 130 31878	1N4003G
6309	4822 130 30621	1N4148
6310	4822 130 31981	BZX79-C3V9
6312	4822 130 31982	BYV27-100
6313	4822 130 30621	1N4148
6314	4822 130 80791	BYV28-200/20
6315	4822 130 34278	BZX79-C6V8

ELECTRICAL PARTSLIST POWER4 MODULE

TRANSISTORS

7202	5322 130 44647	BC368
7211	4822 130 44196	BC548C
7221	4822 130 10812	BDX53BFI
7222	4822 130 40959	BC547B
7223	4822 130 40959	BC547B
7224	4822 130 41691	BC556B
7225	4822 130 40959	BC547B
7226	4822 130 41691	BC556B
7227	4822 130 40995	BD438
7228	4822 130 40959	BC547B
7251	4822 130 41327	BC327-40
7303	4822 130 63726	MTP3055EFI
7304	4822 130 41691	BC556B

TRANSISTORS

7305	4822 130 10847	BDW94C
7315	4822 130 40959	BC547B
7316	4822 130 40959	BC547B
7322	4822 130 44568	BC557B

INTEGRATED CIRCUITS

7201	4822 209 80817	L7805CV
7301	4822 209 90411	AN7164
7302	4822 209 90411	AN7164

AF5 BOARD

TABLE OF CONTENTS

Brief Introduction of the AF5 Board & Variation table ... 12-1
Component and Chip layouts 12-2
Circuit Diagram 12-3
Electrical parts list... 12-4

BRIEF INTRODUCTION OF THE AF5 BOARD

The AF5 Board consists of the following features :

a. SOFAC IC
SOFAC IC TEA6321 (7553) which includes functions such as source selection, loudness control, dynamic bass control, treble control, front/rear volume control and muting function. Sound features such as DBB, DSC and IS are controllable via I^{2}C data from the microprocessor.

The SOFAC IC caters for 4 input sources, namely tuner, tape, CD and AUX. It also has a MONO input which is tied to ground via 100n. In our application , software will switch the input source to MONO input during STANDBY mode and some other occasions where noise from other input sources is undesirable.

Note that the input to the SOFAC IC must be ac coupled to prevent 'plop' noise. Input networks are included to provide appropriate attenuation for various sources.

b. KARAOKE MIC. MIXING
Karaoke Mic. Mixing can be configured to cater for one of the following :
NK : Non Karaoke.
SK : Simple Karaoke which caters for mic. mixing with additional mic. amplifier board.
FK : Full Karaoke with vocal fader and echo effect with additional karaoke board.

c. DOLBY PRO LOGIC (DPL) INTERFACE
DPL Interface can be configured to cater for DPL and also DPL with one of the karaoke functions.

d. LINE OUT
Line Out with JST XH connector for connection to LINE OUT cinch socket.

e. SUB-WOOFER OUTPUT
Sub-Woofer Output with cinch socket for connection to active sub-woofer speaker.

f. INCREDIBLE SURROUND
Incredible Surround effect using transistor circuit BC847C (7517, 7518, 7519, 7520) to create phase shifting and spatial effect.

g. HEADPHONE AMPLIFIER
Headphone Amplifier using Op-Amp. NJM4556AM (7501).

h. CD STANDBY SWITCH
CD Standby control circuit using transistors BC327-40 (7515) and BC847C (7516) which switches on the supply to CD servo control IC , HF circuit and the laser light pen in CD mode only.

i. HEADPHONE SENSING CIRCUIT
Headphone Sensing circuit to mute centre and surround channels in DPL application.

j. ATTENUATION NETWORK
Attenuation network is provided at the output of the AF5 Board for interfacing with the power board of different output power.

Variation

3674
3675
9589
3661/36
DM61/1
3521/35
4525/45
3605/36
4611/46
4572
4573
DM54/1
3645/36
3529
3530
2603
2643
3519/35
3597/35
4623/452
4501/45
1513
1525
1510
1506
3501/35
9507
4600/460
1523
1531/153
1507
DM30
DM31
2586
2652/265
3563/356
9623/962
3523/352
3525/352
2521/252
DM56
DM59
1579
1578
3589
2585
6501

x = Item i

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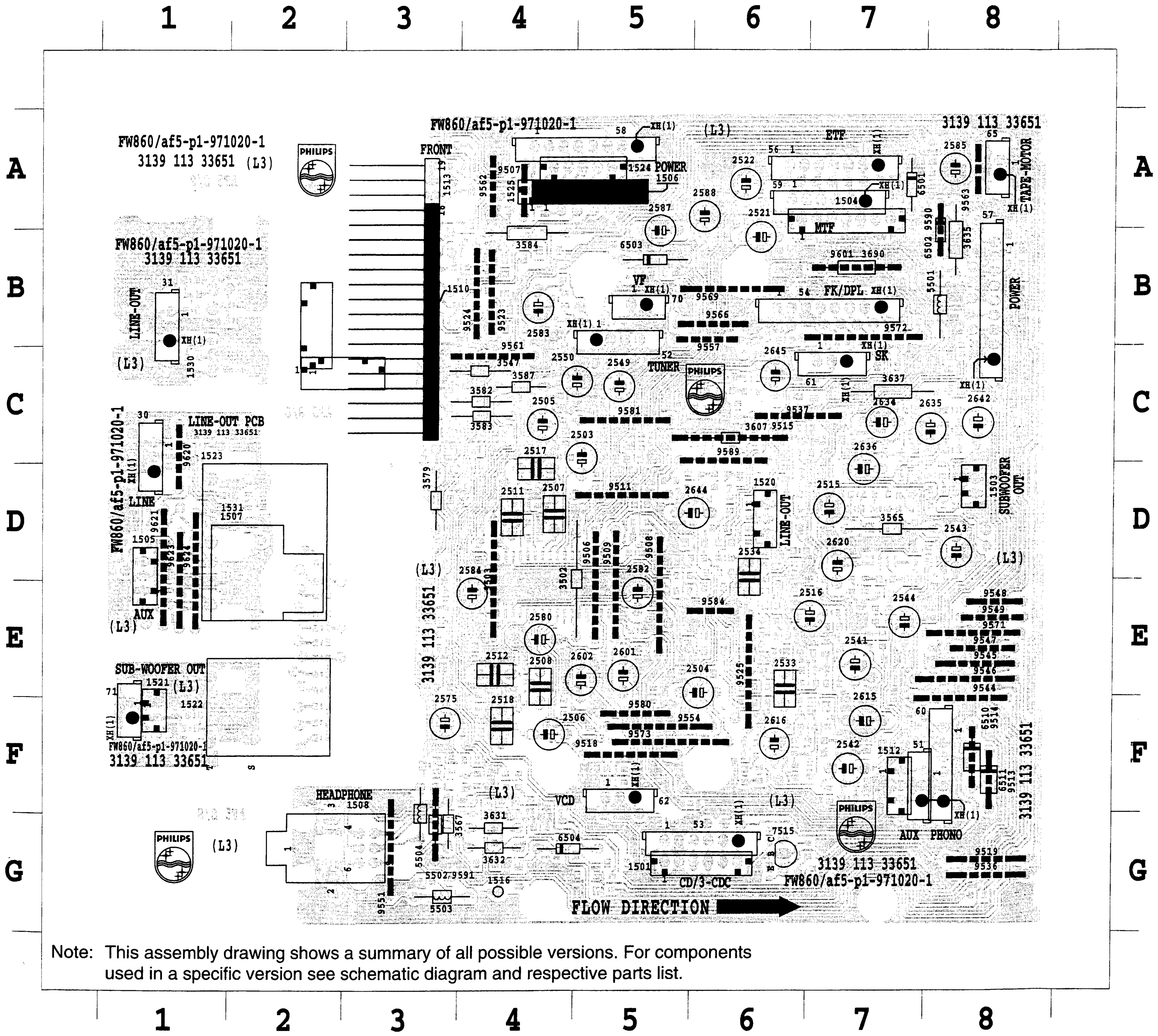
Variations table for AF5 Board

	FW530C /21/21M FW535C /21/21M FW570C /21/21M FW575C /21/21M/33	FW530C /22/37 FW535C /22/30/34 FW550C /22 FW570C /22	FW755P /30	FW754P /37	FW775P /22/30/37	FW765P /22 FW795W /22	FW765P /21/21M FW795W /21	FW520C /37	FW510C /37	FW560C /37
3674	8k2	8k2	15k	15k	15k	15k	15k	8k2	8k2	8k2
3675	2k2	3k3	6k8	4k7	8k2	3k3	2k2	6k8	4k7	8k2
9589	x	-	-	-	-	-	-	-	-	-
3661/3662	5k6	-	-	-	-	-	-	-	-	-
DM61/1577	3P	-	-	-	-	-	-	-	-	-
3521/3522	15k	-	-	-	-	-	-	-	-	-
4525/4580	x	-	-	-	-	-	-	-	-	-
3605/3606	1k5	-	1k2	1k2	1k2	1k2	1k2	-	-	-
4611/4612	x	-	x	x	x	x	x	-	-	-
4572	x	-	x	x	x	x	x	-	-	-
4573	-	-	x	x	x	x	x	-	-	-
DM54/1517	-	-	7P	7P	7P	7P	7P	-	-	-
3645/3636	-	-	1k8	1k8	1k8	1k8	1k8	-	-	-
3529	-	-	5k6	5k6	5k6	5k6	5k6	-	-	-
3530	-	-	15k	15k	15k	15k	15k	-	-	-
2603	-	-	100pF	100pF	100pF	100pF	100pF	-	-	-
2643	-	-	1μF	1μF	1μF	1μF	1μF	-	-	-
3519/3520	-	-	6k8	6k8	6k8	6k8	6k8	-	-	-
3597/3598	-	-	27k	27k	27k	27k	27k	-	-	-
4623/4527	-	-	x	x	x	x	x	-	-	-
4501/4502	-	x	-	-	-	-	-	x	x	x
1513	-	-	-	-	18P	-	-	-	-	18P
1525	-	-	-	-	8P	-	-	-	-	8P
1510	16P	16P	16P	16P	-	16P	16P	16P	16P	-
1506	7P	7P	7P	7P	-	7P	7P	7P	7P	-
3501/3502	100R	100R	100R	100R	10k	100R	100R	100R	100R	10k
9507	x	x	x	x	-	x	x	x	x	-
4600/4602	-	-	-	-	x	-	-	-	-	x
1523	x	x	x	x	-	x	x	-	-	-
1531/1530	-	-	-	-	x	-	-	-	-	x
1507	-	-	-	-	-	-	-	x	x	-
DM30	x	x	x	x	-	x	x	-	-	-
DM31	-	-	-	-	x	-	-	-	-	x
2586	-	-	-	-	100nF	-	-	100nF	100nF	100nF
2652/2653	22nF	22nF	22nF	22nF	-	22nF	22nF	-	-	-
3563/3564	150k	150k	100k	100k	100k	100k	100k	100k	100k	100k
9623/9624	-	-	-	-	x	-	-	-	-	x
3523/3524	8k2	8k2	47k	47k	8k2	8k2	8k2	47k	47k	47k
3525/3526	2k2	2k2	39k	39k	2k2	2k2	2k2	39k	39k	39k
2521/2522	4.7μF	4.7μF	0.47μF	0.47μF	4.7μF	4.7μF	4.7μF	0.47μF	0.47μF	0.47μF
DM56	7P	7P	-	-	7P	7P	7P	-	-	-
DM59	-	-	6P	6P	-	-	-	6P	6P	6P
1579	7P	7P	6P	6P	7P	7P	7P	6P	6P	6P
1578	2P	2P	2P	2P	2P	2P	2P	2P	2P	2P
3589	5k6	5k6	-	-	5k6	5k6	5k6	-	-	-
2585	47μF	47μF	-	-	47μF	47μF	47μF	-	-	-
6501	x	x	-	-	x	x	x	-	-	-

x = Item in use.

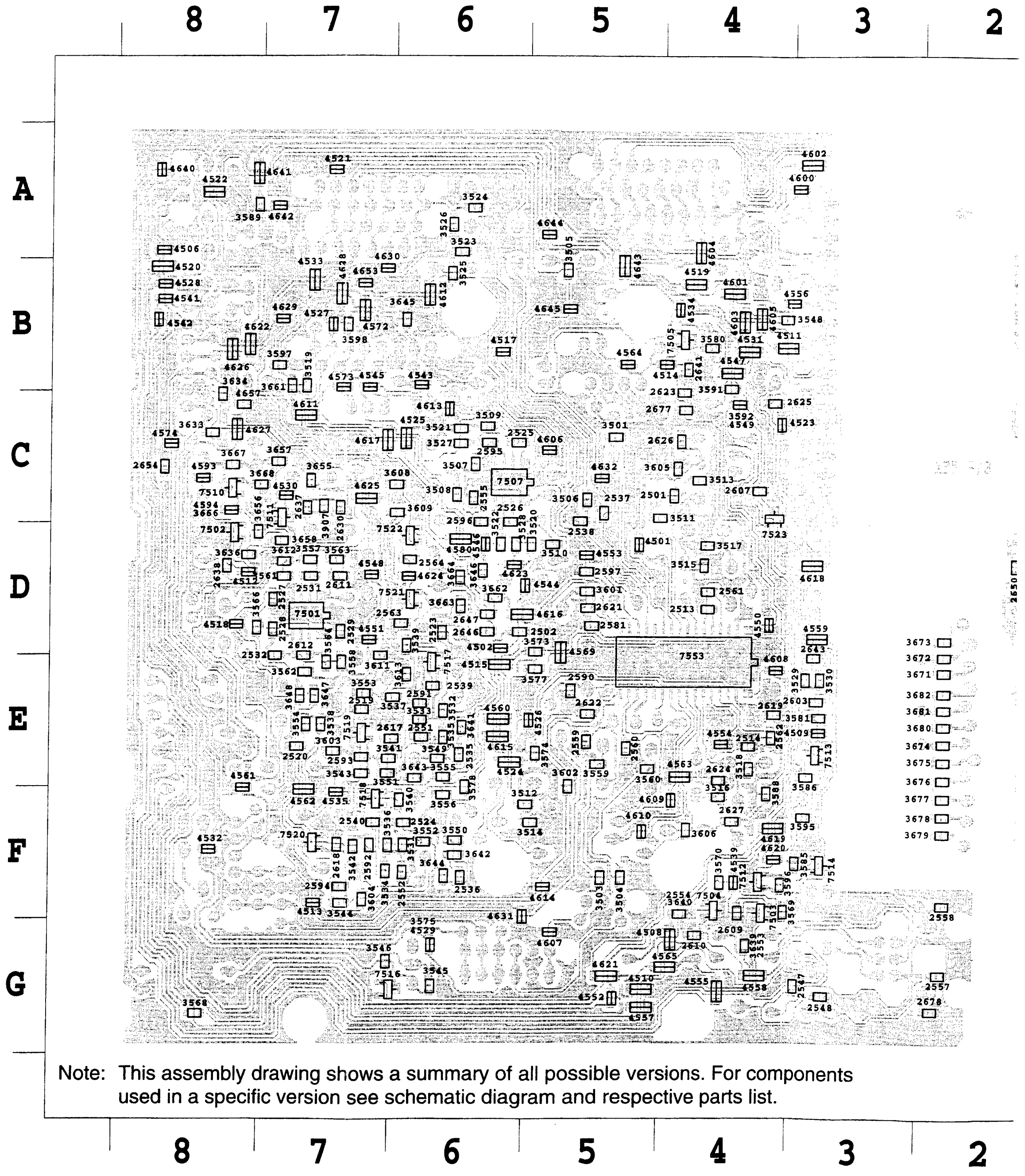
COMPONENT LAYOUT


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
FW860/af5-p1-971020-1
3139 113 33651 (L3)
FRONT
POWER
ETF
MTF
TAPE-MOTOR
VF
FK/DPL
TUNER
SK
LINE-OUT
LINE-OUT PCB
LINE
AUX
SUB-WOOFER OUT
SUBWOOFER OUT
HEADPHONE
VCD
CD/3-CDC
AUX PHONO
FLOW DIRECTION
PHILIPS

Note: This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

30	C	1	2580	E	4	9536	G	8
31	B	1	2582	E	5	9537	C	6
51	F	7	2583	B	4	9544	F	8
52	B	5	2584	E	4	9545	E	8
53	G	6	2585	A	8	9546	E	8
54	B	7	2587	B	5	9547	E	8
56	A	7	2588	A	6	9548	E	8
57	B	8	2601	E	5	9549	E	8
58	A	5	2602	E	5	9551	G	3
59	A	7	2615	F	7	9554	F	5
60	F	8	2616	F	6	9557	B	6
61	C	7	2620	D	7	9561	C	4
62	F	5	2634	C	7	9562	A	4
65	A	8	2635	C	8	9563	A	8
70	B	5	2636	D	7	9566	B	6
71	F	1	2642	C	8	9569	B	6
1501	G	6	2644	D	6	9571	E	8
1503	D	8	2645	C	6	9572	B	7
1504	A	7	3502	E	5	9573	F	5
1505	D	1	3547	C	4	9580	F	5
1506	A	5	3565	D	7	9581	C	5
1507	E	2	3567	G	3	9584	E	6
1508	G	2	3579	D	3	9589	C	6
1510	B	3	3582	C	4	9590	B	8
1512	F	7	3583	C	4	9591	G	3
1513	B	3	3584	B	4	9601	B	7
1516	G	4	3587	C	4	9620	C	1
1520	D	6	3607	C	6	9621	D	1
1521	F	1	3631	G	4	9623	E	1
1522	F	2	3632	G	4	9624	D	1
1523	D	2	3635	B	8			
1524	A	5	3637	C	7			
1525	A	5	3690	B	7			
1530	B	2	5501	B	8			
1531	C	2	5502	G	3			
2503	C	5	5503	G	3			
2504	E	6	5504	G	3			
2505	C	4	6501	A	7			
2506	F	4	6502	B	8			
2507	D	4	6503	B	5			
2508	E	4	6504	G	4			
2511	D	4	6510	F	8			
2512	E	4	6511	F	8			
2515	D	7	7515	G	6			
2516	E	7	9503	E	4			
2517	D	4	9506	E	5			
2518	F	4	9507	A	4			
2521	B	6	9508	E	5			
2522	A	6	9509	E	5			
2533	E	6	9511	D	5			
2534	D	6	9513	F	8			
2541	E	7	9514	F	8			
2542	F	7	9515	C	6			
2543	D	8	9518	F	5			
2544	E	7	9519	G	8			
2549	C	5	9523	B	4			
2550	C	5	9524	B	4			
2575	F	3	9525	E	6			

CHIP LAYOUT


8
7
6
5
4
3
2
A
B
C
D
E
F
G
7553
7507
7501

Note: This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

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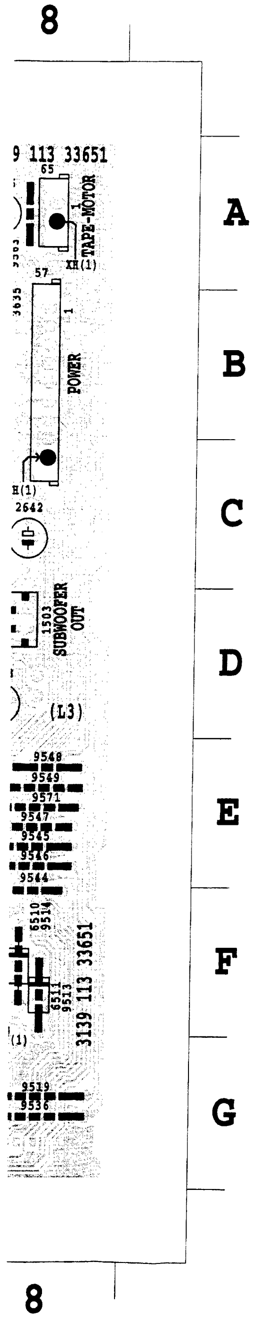

30	C	1
31	B	1
51	F	7
52	B	5
53	G	6
54	B	7
56	A	7
57	B	8
58	A	5
59	A	7
60	F	8
61	C	7
62	F	5
65	A	8
70	B	5
71	F	1
1501	G	6
1503	D	8
1504	A	7
1505	D	1
1506	A	5
1507	E	2
1508	G	2
1510	B	3
1512	F	7
1513	B	3
1516	G	4
1520	D	6
1521	F	1
1522	F	2
1523	D	2
1524	A	5
1525	A	5
1530	B	2
1531	C	2
2503	C	5
2504	E	6
2505	C	4
2506	F	4
2507	D	4
2508	E	4
2511	D	4
2512	E	4
2515	D	7
2516	E	7
2517	D	4
2518	F	4
2521	B	6
2522	A	6
2533	E	6
2534	D	6
2541	E	7
2542	F	7
2543	D	8
2544	E	7
2549	C	5
2550	C	5
2575	F	3
2580	E	4
2582	E	5
2583	B	4
2584	E	4
2585	A	8
2587	B	5
2588	A	6
2601	E	5
2602	E	5
2615	F	7
2616	F	6
2620	D	7
2634	C	7
2635	C	8
2636	D	7
2642	C	8
2644	D	6
2645	C	6
3502	E	5
3547	C	4
3565	D	7
3567	G	3
3579	D	3
3582	C	4
3583	C	4
3584	B	4
3587	C	4
3607	C	6
3631	G	4
3632	G	4
3635	B	8
3637	C	7
3690	B	7
5501	B	8
5502	G	3
5503	G	3
5504	G	3
6501	A	7
6502	B	8
6503	B	5
6504	G	4
6510	F	8
6511	F	8
7515	G	6
9503	E	4
9506	E	5
9507	A	4
9508	E	5
9509	E	5
9511	D	5
9513	F	8
9514	F	8
9515	C	6
9518	F	5
9519	G	8
9523	B	4
9524	B	4
9525	E	6
9536	G	8
9537	C	6
9544	F	8
9545	E	8
9546	E	8
9547	E	8
9548	E	8
9549	E	8
9551	G	3
9554	F	5
9557	B	6
9561	C	4
9562	A	4
9563	A	8
9566	B	6
9569	B	6
9571	E	8
9572	B	7
9573	F	5
9580	F	5
9581	C	5
9584	E	6
9589	C	6
9590	B	8
9591	G	3
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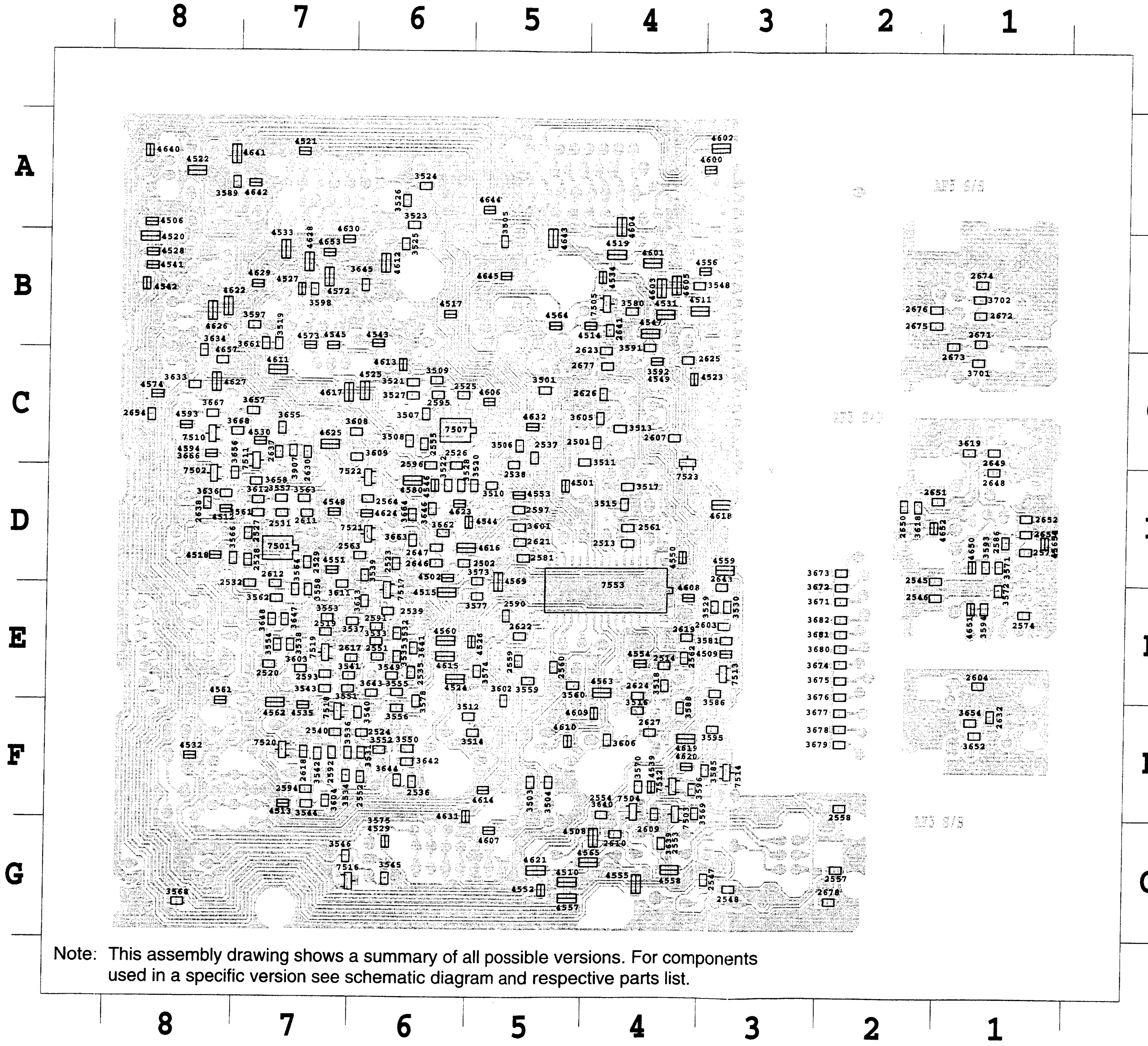
9620	C	1
9621	D	1
9623	E	1
9624	D	1



Note: This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

2501	C	4
2502	D	6
2513	D	4
2514	E	4
2519	E	7
2520	E	7
2523	D	6
2524	F	6
2525	C	6
2526	C	6
2527	D	7
2528	D	7
2529	D	7
2531	D	7
2532	E	7
2535	E	6
2536	F	6
2537	C	5
2538	C	5
2539	E	6
2540	F	7
2545	D	2
2546	E	2
2547	G	3
2548	G	3
2551	E	6
2552	F	6
2553	G	4
2554	F	4
2555	C	6
2557	G	2
2558	F	2
2559	E	5
2560	E	5
2561	D	4
2562	E	4
2563	D	6
2564	D	6
2573	D	1
2574	E	1
2581	D	5
2586	D	1
2590	E	5
2591	E	6
2592	F	7
2593	E	7
2594	F	7
2595	C	6
2596	C	6
2597	D	5
2603	E	3
2604	E	1
2607	C	4
2609	F	4
2610	G	4
2611	D	7
2612	E	7
2617	E	7
2618	F	7
2619	E	4
2621	D	5
2622	E	5
2623	C	4
2624	E	4
2625	C	4
2626	C	4
2627	F	4
2630	C	7
2632	F	1
2637	C	7
2638	D	8
2641	B	4
2643	E	3
2646	D	6
2647	D	6
2648	D	1
2649	C	1
2650	D	2
2651	D	2
2652	D	1
2653	D	1
2654	C	8
2671	B	1
2672	B	1
2673	B	1
2674	B	1
2675	B	2
2676	B	2
2677	C	4
2678	G	2
3501	C	5
3503	F	5
3504	F	5
3505	B	5
3506	C	5
3507	C	6
3508	C	6
3509	C	6
3510	D	5
3511	C	5
3512	F	5
3513	C	4
3514	F	5
3515	D	4
3516	F	4
3517	D	4
3518	E	4
3519	B	7
3520	D	5
3521	C	6
3522	D	6
3523	A	6
3524	A	6
3525	B	6
3526	A	6
3527	C	6
3528	D	6
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3530	E	3
3531	F	6
3532	E	6
3533	E	6
3534	F	7
3535	E	6
3536	F	7
3537	E	6
3538	E	7
3539	D	6
3540	F	6
3541	E	7
3542	F	7
3543	E	7
3544	F	7
3545	G	6
3546	G	7
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3549	E	6
3550	F	6
3551	E	7
3552	F	6
3553	E	7
3554	E	7
3555	E	6
3556	F	6
3557	D	7
3558	E	7
3559	E	5
3560	E	5
3561	D	7
3562	E	7
3563	D	7
3564	E	7
3566	D	8
3568	G	8
3569	F	4
3570	F	4
3571	D	1
3572	E	1
3573	D	5
3574	E	5
3575	G	6
3577	E	5
3578	F	6
3580	B	4
3581	E	3
3585	F	3
3586	E	3
3588	F	4
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3591	B	4
3592	C	4
3593	D	1
3594	E	1
3595	F	3
3596	F	4
3597	B	7
3598	B	7
3601	D	5
3602	E	5
3603	E	7
3604	F	7
3605	C	4
3606	F	4
3608	C	6
3609	C	6
3611	E	7
3612	D	7
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3667	C	8
3668	C	8
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3682	E	2
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3702	B	1
3907	C	7
4501	D	5
4502	D	6
4506	A	8
4508	G	4
4509	E	3
4510	G	5
4511	B	4
4512	D	8
4513	F	7
4514	B	4
4515	E	6
4517	B	6
4518	D	8
4519	B	4
4520	B	8
4521	A	7
4522	A	8
4523	C	4
4524	E	6
4525	C	6
4526	E	5
4527	B	7
4528	B	8
4529	G	6
4530	C	7
4531	B	4
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4535	F	7
4539	F	4
4541	B	8
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4545	B	7
4546	D	6
4547	B	4
4548	D	7
4549	C	4
4550	D	4
4551	D	7
4552	G	5
4553	D	5
4554	E	4
4555	G	4
4556	B	4
4557	G	5
4558	G	4
4559	D	3
4560	E	6
4561	F	8
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4565	G	4
4569	D	5
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4573	B	7
4574	C	8
4580	D	6
4593	C	8
4594	C	8
4600	A	3
4601	B	4
4602	A	3
4603	B	4
4604	A	4
4605	B	4
4606	C	5
4607	G	5
4608	E	4
4609	F	4
4610	F	5
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4614	F	5
4615	E	6
4616	D	6
4617	C	7
4618	D	3
4619	F	4
4620	F	4
4621	G	5
4622	B	8
4623	D	6
4624	D	6
4625	C	7
4626	B	8
4627	C	8
4628	B	7
4629	B	7
4630	B	7
4631	F	6
4632	C	5
4640	A	8
4641	A	8
4642	A	7
4643	B	5
4644	A	5
4645	B	5
4650	D	1
4651	E	1
4652	D	2
4653	B	7
4657	C	8
7501	D	7
7502	D	8
7503	F	4
7504	F	4
7505	B	4
7507	C	6
7510	C	8
7511	C	7
7512	F	4
7513	E	3
7514	F	3
7516	G	7
7517	E	6
7518	F	7
7519	E	7
7520	F	7
7521	D	6
7522	D	6
7523	C	4
7553	E	4
45658	D	1

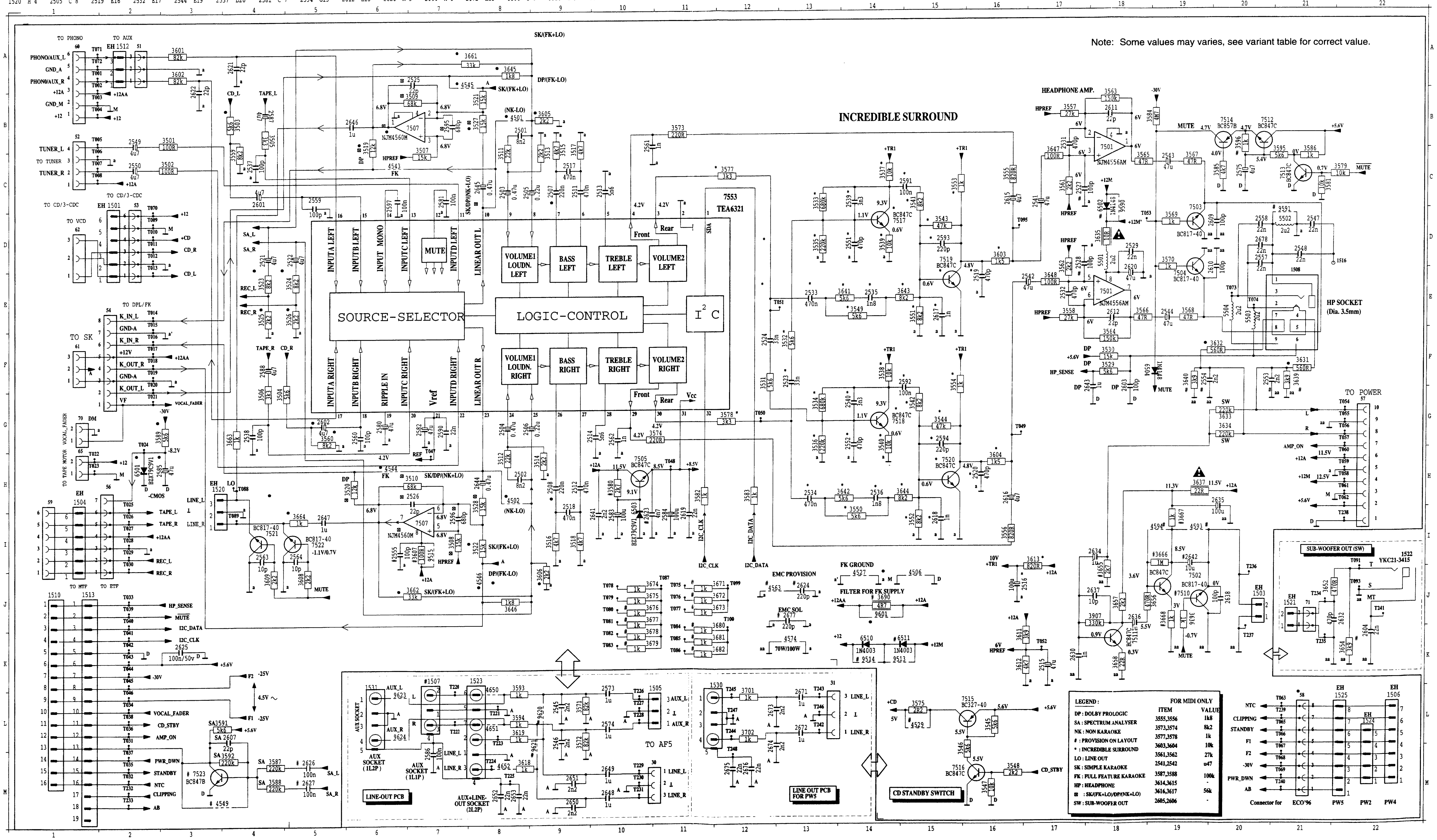
CIRCUIT DIAGRAM

1501	C 2	1521	J21	2506	G 8	2520	H16	2533	E13	2545	L 9	2558	D20	2582	G 7
1503	J20	1522	I22	2507	C 9	2521	D 4	2534	H13	2546	L 9	2559	C 5	2583	I10
1504	H 1	1523	K 8	2508	H 9	2522	D 5	2535	E14	2547	D21	2560	G 6	2584	I11
1505	K11	1524	L22	2511	C 9	2523	F13	2536	H14	2548	D21	2561	B10	2585	H 3
1506	L22	1525	L22	2512	H 9	2524	F12	2537	C 4	2549	B 2	2562	G10	2586	M 7
1507	K 7	1530	K11	2513	C10	2525	A 7	2538	G 4	2550	C 2	2563	I 4	2587	B 4
1508	E21	1531	K 6	2514	G10	2526	H 7	2539	C14	2551	D14	2564	I 5	2588	F 4
1510	J 1	2501	B 8	2515	K17	2527	C17	2540	G14	2552	G14	2573	K10	2590	G 7
1512	A 2	2502	H 8	2516	J16	2528	D17	2541	C17	2553	F20	2574	L10	2591	C15
1513	J 1	2503	C 8	2517	C 9	2529	D18	2542	E17	2554	F19	2575	C20	2592	F15
1516	D22	2504	G 8	2518	H 9	2531	B17	2543	C19	2555	I 6	2580	G 6	2593	D15
1520	H 4	2505	C 8	2519	E16	2532	E17	2544	E19	2557	D20	2581	C 7	2594	G15

2595	B 7	2615	C16	2627	M 5	2645	C 8	2673	L12	3505	B 4	3517	B 9	3529	F18
2596	I 7	2616	H16	2630	K17	2646	B 6	2674	L12	3506	G 4	3518	I 9	3530	F18
2597	C 6	2617	E15	2632	J22	2647	I 5	2675	M12	3507	C 7	3519	B 6	3531	F12
2601	C 4	2618	I15	2634	I18	2648	M10	2676	M12	3508	I 7	3520	H 6	3532	F13
2602	G 5	2619	I11	2635	H20	2649	M10	2677	J13	3509	B 7	3521	B 8	3533	C13
2603	F18	2620	E18	2636	J18	2650	M 9	2678	D20	3510	H 7	3522	I 8	3534	G13
2604	K22	2621	A 4	2637	J18	2651	M 9	30	M10	3511	C 8	3523	E 4	3535	D13
2607	L 4	2622	A 3	2638	J20	2652	M 8	31	K13	3512	H 8	3524	E 5	3536	G13
2609	D20	2623	I10	2641	I10	2653	M 8	3501	B 3	3513	C 9	3525	E 4	3537	C14
2610	E20	2624	J13	2642	I19	2654	J16	3502	C 3	3514	H 9	3526	E 5	3538	F14
2611	B18	2625	K 3	2643	F18	2671	L13	3503	B 4	3515	B 9	3527	B 8	3539	D14
2612	E18	2626	M 5	2644	H 8	2672	L13	3504	G 4	3516	I 9	3528	H 8	3540	G14

3541	C15	3553	C15	3565	C18	3578	G12	3591	L 3	3605	B 9	3633	G20	3646	J 8
3542	G15	3554	F15	3566	E18	3579	C22	3592	M 4	3606	J 9	3634	G20	3647	C17
3543	D15	3555	C16	3567	C19	3580	H10	3593	L 8	3607	I 7	3635	D18	3648	E17
3544	G15	3556	I16	3568	E19	3581	C21	3594	L 8	3608	J 5	3636	J19	3652	J21
3545	L16	3557	B17	3569	D19	3582	H11	3595	C21	3609	J 4	3637	H19	3654	K22
3546	M15	3558	E17	3570	D19	3583	H12	3596	B20	3611	K16	3639	F21	3655	J18
3547	M16	3559	C 4	3571	L 9	3584	B18	3597	B 5	3612	K16	3640	F19	3656	J19
3548	M16	3560	G 5	3572	L 9	3585	C20	3598	H 5	3613	I17	3641	E14	3657	J18
3549	E14	3561	C17	3573	B11	3586	C21	3601	A 3	3618	M 8	3642	H14	3658	K18
3550	I14	3562	D17	3574	G11	3587	M 4	3602	A 3	3619	L 8	3643	E15	3661	A 8
3551	E15	3563	B18	3575	L15	3588	M 4	3603	D16	3631	F21	3644	H15	3662	J 7
3552	I15	3564	F18	3577	C12	3589	G 2	3604	H16	3632	F20	3645	A 8	3663	G 4

3664	I 5	3679	K10	4529	L15	4652	M 8	59	H 1	71	J21	7513	C21	9513	K14
3666	I19	3680	J12	4543	C 6	51	A 2	60	A 1	7501	B18	7514	B20	9514	K14
3667	I19	3681	K12	4544	H 6	52	B 1	61	F 1	7501	E18	7515	L15	9515	I 7
3668	J19	3682	K12	4545	A 7	53	C 2	62	D 1	7502	J19	7516	M15	9590	C18
3671	J12	3690	J14	4546	J 8	54	E 2	65	G 1	7503	D19	7517	D15	9591	D21
3672	J12	3701	L12	4549	M 4	5501	D18	6501	H 2	7504	E19	7518	G15	9601	J14
3673	J12	3702	L12	4563	J12	5502	D21	6502	C18	7505	H10	7519	D15	9620	L 9
3674	J10	3907	J18	4574	K13	5503	E20	6503	H10	7507	B 6	7520	H15	9621	L 9
3675	J10	4501	B 8	4593	I19	5504	E20	6504	F19	7507	I 7	7521	I 4	9623	L 6
3676	J10	4502	H 8	4594	I19	56	H 2	6510	K14	7510	J19	7522	I 5	9624	L 6
3677	J10	4506	J15	4650	L 8	57	G22	6511	K15	7511	K18	7523	M 3		
3678	K10	4527	J14	4651	L 8	58	L21	70	G 1	7512	B20	7553	C12		


TO PHONO
TO AUX
PHONO/AUX_L
GND_A
PHONO/AUX_R
GND_M
TUNER_L
TUNER_R
TO TUNER
TO CD/3-CDC
TO VCD
TO DPL/FK
TO SK
TO MTF
TO ETF
SOURCE-SELECTOR
LOGIC-CONTROL
I²C
INPUTA LEFT
INPUTB LEFT
INPUT MONO
INPUTC LEFT
MUTE
INPUTD LEFT
LINEAR OUT L
INPUTA RIGHT
INPUTB RIGHT
RIPPLE IN
INPUTC RIGHT
Vref
INPUTD RIGHT
LINEAR OUT R
VOLUME1 LOUDN. LEFT
BASS LEFT
TREBLE LEFT
VOLUME2 LEFT
VOLUME1 LOUDN. RIGHT
BASS RIGHT
TREBLE RIGHT
VOLUME2 RIGHT
7553
TEA6321
INCREDIBLE SURROUND
HEADPHONE AMP.
NJM4556AM
NJM4560M
HP SOCKET (Dia. 3.5mm)
TO POWER
SUB-WOOFER OUT (SW)
YKC21-3415
EMC PROVISION
FK GROUND
FILTER FOR FK SUPPLY
EMC SOL
LINE-OUT PCB
TO AF5
LINE OUT PCB FOR PW5
CD STANDBY SWITCH
AUX SOCKET (1L2P)
AUX SOCKET (1L1P)
AUX+LINE-OUT SOCKET (2L2P)
Connector for ECO'96
PW5
PW2
PW4

Note: Some values may varies, see variant table for correct value.

LEGEND :

DP : DOLBY PROLOGIC
SA : SPECTRUM ANALYSER
NK : NON KARAOKE
: PROVISION ON LAYOUT
* : INCREDIBLE SURROUND
LO : LINE OUT
SK : SIMPLE KARAOKE
FK : FULL FEATURE KARAOKE
HP : HEADPHONE
⊠ : SK/(FK+LO)/DP/(NK+LO)
SW : SUB-WOOFER OUT

FOR MIDI ONLY

ITEM	VALUE
3555,3556	1k8
3573,3574	8k2
3577,3578	1k
3603,3604	10k
3561,3562	27k
2541,2542	u47
3587,3588	100k
3614,3615	-
3616,3617	56k
2605,2606	-

9620 } Provision for Dual Aux-In
9621

1531
9623 } For Power 5 Only
9624

4650 } Used when 1507 OR 1523 is used
4651

ELECTRICAL PARTS LIST - AF5 BOARD

MISCELLANEOUS

1508	4822 267 40898	Headphone Socket
1510	4822 265 41325	Connector 16 Pin
1522	4822 267 31729	Cinch Socket - Sub-Woofer out
1523	4822 267 31823	Cinch Socket - Aux/Line-out

CAPACITORS

2501	4822 126 10525	8,2nF 10% 63V
2502	4822 126 10525	8,2nF 10% 63V
2503	4822 124 41407	0,47µF 20% 63V
2504	4822 124 41407	0,47µF 20% 63V
2505	4822 124 40746	0,22µF20% 63V
2506	4822 124 40746	0,22µF20% 63V
2507	4822 121 42408	220nF 5% 63V
2508	4822 121 42408	220nF 5% 63V
2511	4822 121 51252	470nF 5% 63V
2512	4822 121 51252	470nF 5% 63V
2513	4822 122 32646	5,6nF 10% 50V
2514	4822 122 32646	5,6nF 10% 50V
2515	4822 124 81029	100µF 20% 25V
2516	4822 124 81029	100µF 20% 25V
2517	4822 121 51252	470nF 5% 63V
2518	4822 121 51252	470nF 5% 63V
2519	5322 122 32268	470pF 10% 50V
2520	5322 122 32268	470pF 10% 50V
2521	4822 124 40246	4,7µF 20% 63V
2522	4822 124 40246	4,7µF 20% 63V
2523	4822 126 12105	33nF 5% 63V
2524	4822 126 12105	33nF 5% 63V
2525	5322 122 32658	22pF 5% 50V
2526	5322 122 32658	22pF 5% 50V
2529	5322 122 32654	22nF 10% 63V
2531	5322 122 32268	470pF 10% 50V
2532	5322 122 32268	470pF 10% 50V
2533	4822 121 51252	470nF 5% 63V
2534	4822 121 51252	470nF 5% 63V
2535	4822 126 10847	1,8nF 10% 63V
2536	4822 126 10847	1,8nF 10% 63V
2537	5322 122 32531	100pF 5% 50V
2538	5322 122 32531	100pF 5% 50V
2539	4822 122 33891	3,3nF 10% 63V
2540	4822 122 33891	3,3nF 10% 63V
2541	4822 124 41751	47µF 20% 50V
2542	4822 124 41751	47µF 20% 50V
2543	4822 124 41751	47µF 20% 50V
2544	4822 124 41751	47µF 20% 50V
2545	5322 122 32268	470pF 10% 50V
2546	5322 122 32268	470pF 10% 50V
2547	5322 122 32654	22nF 10% 63V
2548	4822 126 10002	100nF 20% 25V
2549	4822 124 40246	4,7µF 20% 63V
2550	4822 124 40246	4,7µF 20% 63V
2551	5322 122 32268	470pF 10% 50V
2552	5322 122 32268	470pF 10% 50V
2557	5322 122 32654	22nF 10% 63V
2558	5322 122 32654	22nF 10% 63V
2559	5322 122 32531	100pF 5% 50V
2560	5322 122 32531	100pF 5% 50V
2561	5322 122 34123	1nF 10% 50V
2562	5322 122 34123	1nF 10% 50V
2563	5322 122 32448	10pF 5% 50V
2564	5322 122 32448	10pF 5% 50V
2573	4822 126 13836	1µF 16V
2574	4822 126 13836	1µF 16V
2575	4822 124 40246	4,7µF 20% 63V
2580	4822 124 41751	47µF 20% 50V
2581	4822 126 10002	100nF 20% 25V
2582	4822 124 41751	47µF 20% 50V
2583	4822 124 81029	100µF 20% 25V
2584	4822 124 81029	100µF 20% 25V
2585	4822 124 41751	47µF 20% 50V
2587	4822 124 40246	4,7µF 20% 63V
2588	4822 124 40246	4,7µF 20% 63V
2590	5322 122 32654	22nF 10% 63V
2591	4822 126 10002	100nF 20% 25V
2592	4822 126 10002	100nF 20% 25V
2593	4822 122 33575	220pF 5% 50V
2594	4822 122 33575	220pF 5% 50V
2595	4822 122 32535	680pF 10% 63V
2596	4822 122 32535	680pF 10% 63V
2597	4822 126 10002	100nF 20% 25V
2601	4822 124 40246	4,7µF 20% 63V
2602	4822 124 40246	4,7µF 20% 63V
2604	5322 122 32654	22nF 10% 63V
2609	5322 122 32531	100pF 5% 50V
2610	5322 122 32531	100pF 5% 50V
2611	5322 122 32658	22pF 5% 50V
2612	5322 122 32658	22pF 5% 50V
2615	4822 124 40246	4,7µF 20% 63V
2616	4822 124 40246	4,7µF 20% 63V
2617	5322 122 34123	1nF 10% 50V
2618	5322 122 34123	1nF10% 50V
2619	5322 122 32654	22nF 10% 63V
2620	4822 124 40433	47µF 20% 25V
2621	5322 122 32658	22pF 5% 50V
2622	5322 122 32658	22pF 5% 50V
2623	5322 126 10223	4,7nF 10% 63V
2625	4822 126 10002	100nF 20% 25V
2630	5322 122 34123	1nF 10% 50V
2632	5322 122 32268	470pF 10% 50V
2634	4822 124 40242	1µF 20% 63V
2635	4822 124 81029	100µF 20% 25V
2636	4822 124 40242	1µF 20% 63V
2637	5322 122 32448	10pF 5% 50V
2638	5322 122 32531	100pF 5% 50V
2641	4822 122 33175	2,2nF 20% 50V
2644	4822 124 41407	0,47µF 20% 63V
2645	4822 124 41407	0,47µF 20% 63V
2646	4822 126 13836	1µF 16V
2647	4822 126 13836	1µF 16V
2648	4822 126 13836	1µF 16V
2649	4822 126 13836	1µF 16V
2650	4822 122 33175	2,2nF 20% 50V
2651	4822 122 33175	2,2nF 20% 50V
2652	5322 122 32654	22nF 10% 63V
2653	5322 122 32654	22nF 10% 63V
2654	4822 122 33575	220pF 5% 50V
2678	5322 122 32654	22nF 10% 63V

RESISTORS

3501	4822 051 20101	100R 5% 0,1W
3502	4822 116 52175	100R 5% 0,5W
3503	4822 051 20562	5k6 5% 0,1W
3504	4822 051 20562	5k6 5% 0,1W
3505	4822 051 20332	3k3 5% 0,1W
3506	4822 051 20332	3k3 5% 0,1W
3507	4822 051 20153	15k 5% 0,1W
3508	4822 051 20153	15k 5% 0,1W
3509	4822 051 20683	68k 5% 0,1W
3510	4822 051 20683	68k 5% 0,1W
3511	4822 051 20223	22k 5% 0,1W
3512	4822 051 20223	22k 5% 0,1W
3513	4822 117 11449	2k2 1% 0,1W
3514	4822 117 11449	2k2 1% 0,1W
3515	4822 051 20472	4k7 5% 0,1W
3516	4822 051 20472	4k7 5% 0,1W
3517	4822 051 20472	4k7 5% 0,1W
3518	4822 051 20472	4k7 5% 0,1W
3521	4822 051 20153	15k 5% 0,1W
3522	4822 051 20153	15k 5% 0,1W
3523	4822 051 20822	8k2 5% 0,1W
3524	4822 051 20822	8k2 5% 0,1W
3525	4822 051 20332	3k3 5% 0,1W
3526	4822 051 20332	3k3 5% 0,1W
3527	4822 051 20153	15k 5% 0,1W
3528	4822 051 20153	15k 5% 0,1W
3531	4822 051 20562	5k6 5% 0,1W
3532	4822 051 20562	5k6 5% 0,1W
3533	4822 051 20684	680k 5% 0,1W
3534	4822 051 20684	680k 5% 0,1W
3535	4822 051 20224	220k 5% 0,1W
3536	4822 051 20224	220k 5% 0,1W
3537	4822 117 10833	10k 1% 0,1W
3538	4822 117 10833	10k 1% 0,1W
3539	4822 117 10833	10k 1% 0,1W
3540	4822 117 10833	10k 1% 0,1W
3541	4822 051 20822	8k2 5% 0,1W
3542	4822 051 20822	8k2 5% 0,1W
3543	4822 117 10834	47k 1% 0,1W
3544	4822 117 10834	47k 1% 0,1W
3545	4822 051 20562	5k6 5% 0,1W
3546	4822 051 20562	5k6 5% 0,1W
3547	4822 116 83864	10k 5% 0,5W
3548	4822 117 11449	2k2 1% 0,1W
3549	4822 051 20562	5k6 5% 0,1W
3550	4822 051 20562	5k6 5% 0,1W
3551	4822 051 20822	8k2 5% 0,1W
3552	4822 051 20822	8k2 5% 0,1W
3553	4822 051 10102	1k 2% 0,25W
3554	4822 051 10102	1k 2% 0,25W
3555	4822 117 11454	820R 1% 0,1W
3556	4822 117 11454	820R 1% 0,1W
3557	4822 051 20273	27k 5% 0,1W
3558	4822 051 20273	27k 5% 0,1W
3559	4822 051 20822	8k2 5% 0,1W
3560	4822 051 20822	8k2 5% 0,1W
3561	4822 051 20153	15k 5% 0,1W
3562	4822 051 20153	15k 5% 0,1W
3563	4822 051 20154	150k 5% 0,1W
3564	4822 051 20154	150k 5% 0,1W
3565	4822 116 52195	47R 5% 0,5W
3566	4822 051 20479	47R 5% 0,1W
3567	4822 116 52195	47R 5% 0,5W
3568	4822 051 20479	47R 5% 0,1W
3569	4822 051 10102	1k 2% 0,25W
3570	4822 051 10102	1k 2% 0,25W
3571	4822 117 11149	82k 1% 0,1W
3572	4822 117 11149	82k 1% 0,1W
3573	4822 117 11503	220R 1% 0.1W
3574	4822 117 11503	220R 1% 0.1W
3575	4822 051 20228	2R2 5% 0,1W
3577	4822 051 20332	3k3 5% 0,1W
3577	4822 051 20472	4k7 5% 0,1W /21/21M
3578	4822 051 20332	3k3 5% 0,1W
3578	4822 051 20472	4k7 5% 0,1W /21/21M
3579	4822 116 83864	10k 5% 0,5W
3581	4822 117 10833	10k 1% 0,1W
3582	4822 050 11002	1k 1% 0,4W
3583	4822 050 11002	1k 1% 0,4W
3584	4822 050 24705	4M7 1% 0,6W
3585	4822 051 20472	4k7 5% 0,1W
3586	4822 051 10102	1k 2% 0,25W
3589	4822 051 20562	5k6 5% 0,1W
3593	4822 051 10102	1k 2% 0,25W
3594	4822 051 10102	1k 2% 0,25W

ELECTRICAL PARTS LIST - AF5 BOARD

RESISTORS

3595	4822 051 20562		5k6 5% 0,1W
3601	4822 117 11149		82k 1% 0,1W
3602	4822 117 11149		82k 1% 0,1W
3603	4822 117 11139		1k5 1% 0,1W
3604	4822 117 11139		1k5 1% 0,1W
3605	4822 117 11139		1k5 1% 0,1W
3606	4822 117 11139		1k5 1% 0,1W
3608	4822 117 11449		2k2 1% 0,1W
3609	4822 117 11449		2k2 1% 0,1W
3611	4822 051 20392		3k9 5% 0,1W
3612	4822 051 20472		4k7 5% 0,1W
3613	4822 117 11454		820R 1% 0,1W
3618	4822 051 10102		1k 2% 0,25W
3619	4822 051 10102		1k 2% 0,25W
3631	4822 116 52226		560R 5% 0,5W
3632	4822 116 52226		560R 5% 0,5W
3633	4822 051 20224		220k 5% 0,1W
3634	4822 051 20224		220k 5% 0,1W
3635	4822 052 10109	⚠	10R 5% 0,33W
3636	4822 051 10102		1k 2% 0,25W
3637	4822 052 10229	⚠	22R 5% 0,33W
3641	4822 051 20562		5k6 5% 0,1W
3642	4822 051 20562		5k6 5% 0,1W
3643	4822 051 20822		8k2 5% 0,1W
3644	4822 051 20822		8k2 5% 0,1W
3647	4822 051 20101		100R 5% 0,1W
3648	4822 051 20101		100R 5% 0,1W
3652	4822 051 20471		470R 5% 0,1W
3654	4822 051 20392		3k9 5% 0,1W
3656	4822 051 20471		470R 5% 0,1W
3657	4822 117 11449		2k2 1% 0,1W
3658	4822 051 20229		22R 5% 0,1W
3661	4822 051 20562		5k6 5% 0,1W
3662	4822 051 20562		5k6 5% 0,1W
3663	4822 051 10102		1k 2% 0,25W
3664	4822 051 10102		1k 2% 0,25W
3674	4822 051 20822		8k2 5% 0,1W
3675	4822 051 20332		3k3 5% 0,1W
3675	4822 117 11449		2k2 1% 0,1W /21/21M
3907	4822 051 20334		330k 5% 0,1W
4501	4822 051 20008		0R Jumper 0805
4502	4822 051 20008		0R Jumper 0805
4506	4822 051 20008		0R Jumper 0805
4508	4822 051 10008		0R Jumper 1206
4509	4822 051 20008		0R Jumper 0805
4510	4822 051 10008		0R Jumper 1206
4512	4822 051 20008		0R Jumper 0805
4513	4822 051 20008		0R Jumper 0805
4514	4822 051 20008		0R Jumper 0805
4515	4822 051 10008		0R Jumper 1206
4517	4822 051 20008		0R Jumper 0805
4518	4822 051 20008		0R Jumper 0805
4519	4822 051 10008		0R Jumper 1206
4520	4822 051 10008		0R Jumper 1206
4521	4822 051 20008		0R Jumper 0805
4522	4822 051 10008		0R Jumper 1206
4523	4822 051 20008		0R Jumper 0805
4524	4822 051 10008		0R Jumper 1206
4525	4822 051 10008		0R Jumper 1206
4526	4822 051 20008		0R Jumper 0805
4528	4822 051 20008		0R Jumper 0805
4530	4822 051 20008		0R Jumper 0805
4531	4822 051 10008		0R Jumper 1206
4532	4822 051 20008		0R Jumper 0805
4533	4822 051 10008		0R Jumper 1206
4534	4822 051 20008		0R Jumper 0805
4535	4822 051 20008		0R Jumper 0805
4539	4822 051 20008		0R Jumper 0805
4541	4822 051 20008		0R Jumper 0805
4542	4822 051 20008		0R Jumper 0805
4548	4822 051 20008		0R Jumper 0805
4550	4822 051 20008		0R Jumper 0805
4551	4822 051 20008		0R Jumper 0805
4552	4822 051 20008		0R Jumper 0805
4553	4822 051 20008		0R Jumper 0805
4554	4822 051 20008		0R Jumper 0805
4555	4822 051 10008		0R Jumper 1206
4556	4822 051 20008		0R Jumper 0805
4557	4822 051 10008		0R Jumper 1206
4558	4822 051 10008		0R Jumper 1206
4559	4822 051 10008		0R Jumper 1206
4560	4822 051 10008		0R Jumper 1206
4561	4822 051 20008		0R Jumper 0805
4562	4822 051 10008		0R Jumper 1206
4569	4822 051 10008		0R Jumper 1206
4572	4822 051 10008		0R Jumper 1206
4573	4822 051 20008		0R Jumper 0805
4574	4822 051 20008		0R Jumper 0805
4580	4822 051 10008		0R Jumper 1206
4593	4822 051 20008		0R Jumper 0805
4594	4822 051 20008		0R Jumper 0805
4601	4822 051 10008		0R Jumper 1206
4603	4822 051 10008		0R Jumper 1206
4604	4822 051 10008		0R Jumper 1206
4606	4822 051 20008		0R Jumper 0805
4607	4822 051 20008		0R Jumper 0805
4608	4822 051 20008		0R Jumper 0805
4609	4822 051 20008		0R Jumper 0805
4610	4822 051 20008		0R Jumper 0805
4611	4822 051 10008		0R Jumper 1206
4612	4822 051 10008		0R Jumper 1206
4613	4822 051 20008		0R Jumper 0805
4614	4822 051 20008		0R Jumper 0805
4615	4822 051 10008		0R Jumper 1206

ELECTRICAL PARTS LIST - AF5 BOARD

RESISTORS

4616	4822 051 10008	0R Jumper 1206
4617	4822 051 10008	0R Jumper 1206
4622	4822 051 10008	0R Jumper 1206
4623	4822 051 20008	0R Jumper 0805
4624	4822 051 20008	0R Jumper 0805
4625	4822 051 10008	0R Jumper 1206
4626	4822 051 10008	0R Jumper 1206
4628	4822 051 10008	0R Jumper 1206
4629	4822 051 20008	0R Jumper 0805
4630	4822 051 20008	0R Jumper 0805
4631	4822 051 20008	0R Jumper 0805
4632	4822 051 20008	0R Jumper 0805
4640	4822 051 20008	0R Jumper 0805
4641	4822 051 10008	0R Jumper 1206
4642	4822 051 20008	0R Jumper 0805
4643	4822 051 10008	0R Jumper 1206
4644	4822 051 20008	0R Jumper 0805
4645	4822 051 20008	0R Jumper 0805
4650	4822 051 20008	0R Jumper 0805
4651	4822 051 20008	0R Jumper 0805
4652	4822 051 20008	0R Jumper 0805
4653	4822 051 20008	0R Jumper 0805
4657	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5501	4822 157 11477	Fixed Inductor 2µ2 50%
5502	4822 157 11477	Fixed Inductor 2µ2 50%
5503	4822 157 11477	Fixed Inductor 2µ2 50%
5504	4822 157 11477	Fixed Inductor 2µ2 50%

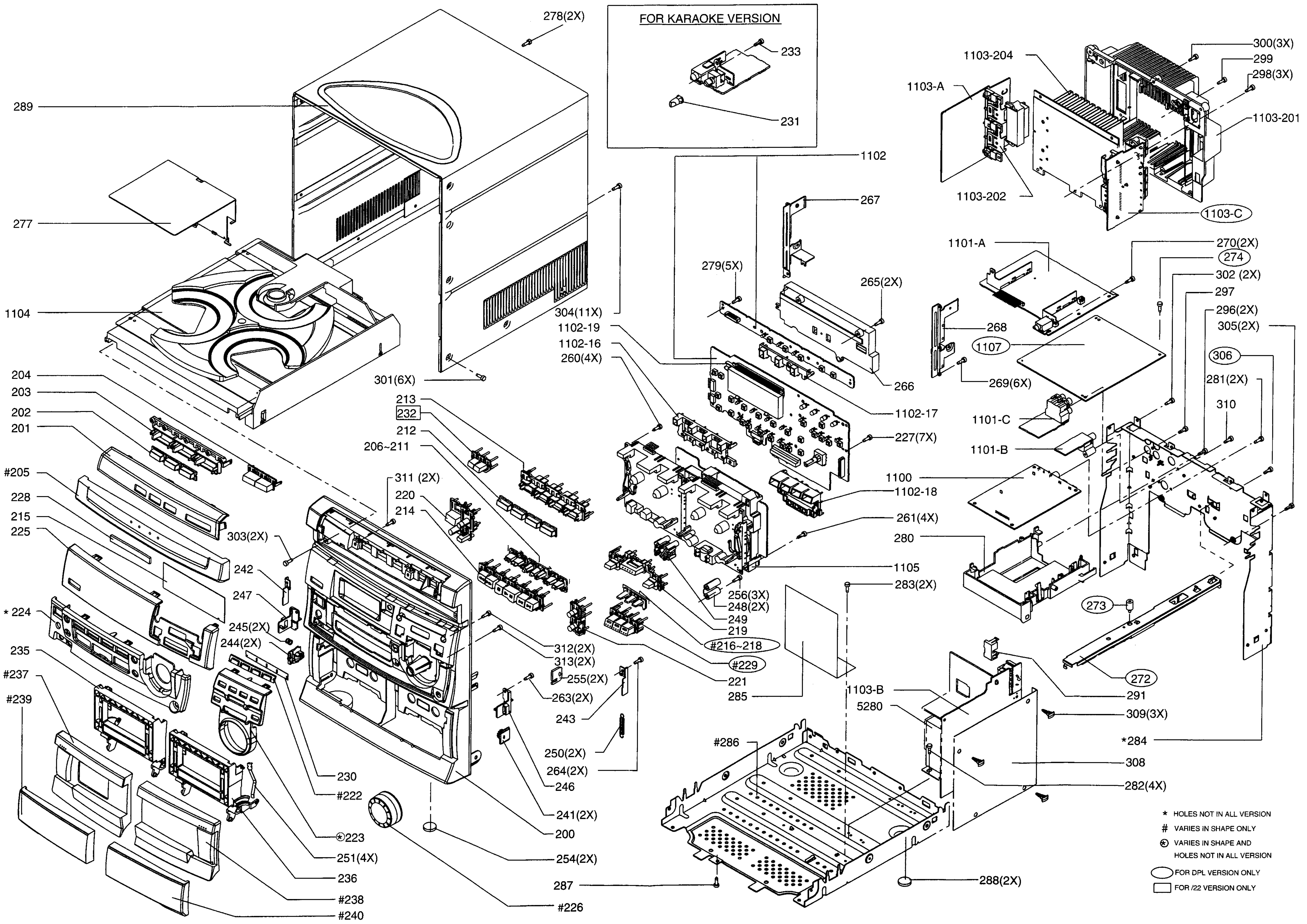
DIODES

6501	4822 130 30862	BZX79-B9V1
6503	4822 130 30862	BZX79-B9V1
6504	4822 130 30621	1N4148
6510	4822 130 31878	1N4003G
6511	4822 130 31878	1N4003G

TRANSISTORS & INTEGRATED CIRCUITS

7501	4822 209 31378	NJM4556MB
7502	4822 130 42804	BC817-25
7503	4822 130 42804	BC817-25
7504	4822 130 42804	BC817-25
7505	5322 130 42755	BC847C
7507	4822 209 83357	NJM4560M
7511	5322 130 42755	BC847C
7512	5322 130 42755	BC847C
7513	5322 130 42755	BC847C
7514	5322 130 60508	BC857B
7515	4822 130 41246	BC327-25
7516	5322 130 42755	BC847C
7517	5322 130 42755	BC847C
7518	5322 130 42755	BC847C
7519	5322 130 42755	BC847C
7520	5322 130 42755	BC847C
7521	5322 130 42755	BC847C
7522	5322 130 42755	BC847C
7553	4822 209 33652	TEA6321T/V1

Note: Only the parts mentioned in this list are normal service spare parts.


278(2X)
FOR KARAOKE VERSION
233
231
289
277
1104
204
203
202
201
#205
228
215
225
*224
235
#237
#239
304(11X)
1102-19
1102-16
260(4X)
301(6X)
213
232
212
206~211
311 (2X)
220
214
303(2X)
242
247
245(2X)
244(2X)
1102
267
279(5X)
265(2X)
266
1102-17
227(7X)
1100
1102-18
261(4X)
1105
256(3X)
248(2X)
249
219
#216~218
#229
221
285
283(2X)
312(2X)
313(2X)
255(2X)
263(2X)
243
250(2X)
264(2X)
246
241(2X)
200
254(2X)
230
#222
⊛223
251(4X)
236
#238
#240
#226
287
#286
288(2X)
1103-204
1103-A
1103-202
300(3X)
299
298(3X)
1103-201
1103-C
1101-A
270(2X)
274
302 (2X)
297
296(2X)
305(2X)
268
1107
269(6X)
306
281(2X)
310
1101-C
1101-B
280
273
272
291
1103-B
5280
309(3X)
*284
308
282(4X)

* HOLES NOT IN ALL VERSION

VARIES IN SHAPE ONLY

⊛ VARIES IN SHAPE AND HOLES NOT IN ALL VERSION

○ FOR DPL VERSION ONLY

☐ FOR /22 VERSION ONLY

MECHANICAL & ACCESSORIES PARTS LIST - MAIN UNIT

200	4822 459 04889	Cabinet Front
201	4822 450 10442	Window CDC
202	4822 410 11645	Button Set CDC
203	4822 464 10372	Frame Button Set CDC
204	4822 410 11646	Button Set Open/Close
205	4822 442 01226	Cover Tray CDC /37
205	4822 442 01246	Cover Tray CDC /21/21M/22
212	4822 410 11647	Button Set Source Select
213	4822 464 10373	Frame Button Source Select
214	4822 410 11648	Button Set Control
219	4822 410 11649	Button Set DSC/DBB 1
220	4822 410 11651	Button Set Power
221	4822 410 11652	Button Set PROG/HSD
223	4822 426 10582	Panel Control DSC1
224	4822 454 13264	Orn Display /37
224	4822 454 13278	Orn Display /22
224	4822 450 10469	Orn Display /21/21M
225	4822 450 10443	Window Display /21/21M/37
225	4822 454 13279	Window Display /22
226	4822 410 11653	Knob Volume
228	4822 454 13265	Badge (PH-MAG) Assy /37
228	4822 454 13035	Badge-PHILIPS /21/21M/22
231	4822 410 11595	Knob Karaoke /21/21M
232	4822 410 11698	Button RDS/NEWS /22
235	4822 443 10488	Door Cassette Right
236	4822 443 10487	Door Cassette Left
237	4822 442 01227	Cover Cassette Left
238	4822 442 01228	Cover Cassette Right
239	4822 381 11937	Lens Cassette Left
240	4822 381 11938	Lens Cassette Right
241	4822 529 10322	Damper Assembly
244	4822 402 10621	Push-Catch
245	4822 492 11344	Spring Compression
250	4822 492 11345	Spring Tension
251	4822 492 42787	Spring Cassette
254	4822 462 40683	Plate (Foot)
288	4822 462 40683	Plate (Foot)
289	4822 426 10583	Cabinet Rear
291	4822 402 10288	Bracket Mains Socket
309	4822 466 93148	Spacer 5mm
350	4822 445 10711	LS Pair To Single /37
350	4822 445 10723	LS Pair To Single /21/21M/22
351	4822 320 11094	FM Aerial /37
351	4822 303 50063	FM Aerial /21/21M/22
356	4822 219 10429	Remote Control /37
356	4822 219 10446	Remote Control /21/21M/22
384	4822 303 50082	AM Frame Aerial
385	4822 321 10883	⚠ Mains Cord /37
385	4822 321 10249	⚠ Mains Cord /21/21M/22
387	4822 736 15908	Instruction For Use /37
387	4822 736 15935	Instruction For Use /22
387	4822 736 15971	Instruction For Use /21/21M
5280	4822 146 10746	⚠ Transformer /37
5280	4822 146 10728	⚠ Transformer /22
5280	4822 146 10755	⚠ Transformer /21/21M

Note: Only the parts mentioned in this list are normal service spare parts.

SCREW LISTS - MAIN UNIT

227	D3 x 12
233	D3 x 12
256	D3 x 30
260	D3 x 12
261	D3 x 30
263	D3 x 12
264	D3 x 12
265	D3 x 12
269	D3 x 12
270	D3 x 10
278	M3 x 10
279	D3 x 12
281	D3 x 12
282	M3 x 6
283	M3 x 6
287	M3 x 10
296	D3 x 12
297	D3 x 12
298	M3 x 10
299	D3 x 12
300	M3 x 10
301	M3 x 10
302	D3 x 10
303	D3 x 10
304	M3 x 10
305	M3 x 10
310	D3 x 12
311	D3 x 10
312	D3 x 10
313	D3 x 10